A comparison of the sexual and reproductive experiences and intentions of adolescents perinatally infected with HIV to those of other adolescents in Uganda

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Introduction

In a high HIV prevalence setting such as sub-Saharan Africa and where heterosexual contact is the predominant mode of HIV infection, the chances of acquiring the virus are high in cases of acts of unprotected sex with many partners. But how would HIV/AIDS affect sexual activity? Would the knowledge of one's HIV status lead to more careful or to further reckless sexual behaviour? The evidence here is mixed. On the one hand, there are studies that found positive changes in sexual behaviours of HIV-positive individuals and sero-discordant couples after they received voluntary counselling and testing (VCT) for HIV (Allen et al. 2003; Marks et al. 2005; Voluntary HIV-1 Counseling and Testing Efficacy Study Group 2000). On the other hand, there are studies that have documented high-risk sexual behaviours among HIV-positive individuals, who are aware of their sero-status, especially with partners who are also HIV-positive (Bell et al. 2007; Golden et al. 2007; Johnson and Buzducea 2007; Kalichman 2000; Rice et al. 2006). Other studies among those who are HIV-negative have also found higher likelihood of engaging in high-risk sexual behaviours after than before VCT (Matovu et al. 2007).

The debate about the relationship between HIV/AIDS and sexual activity extends to that between HIV/AIDS and fertility, especially with respect to whether and how HIV/AIDS would affect fertility and vice versa. Studies have found a substantial reduction in fertility among HIV-infected women compared to those who are uninfected (Glynn et al. 2000; Hunter et al. 2003; Lewis et al. 2004; Thackway et al. 1997). Fertility reductions due to HIV/AIDS can result from

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either the reduced capacities of infected women and men to reproduce or from the increased death rates among women and men of reproductive age (Ntozi 2002; Setel 1995). But HIV/AIDS can also lead to an increase in fertility especially when infected individuals are under societal pressure to have sex, reproduce, or replace those children who have died. Lewis et al. (2004), for instance, found that among young women aged 15-19 years, fertility was higher among those infected with HIV than among their uninfected counterparts, perhaps reflecting the pressure of sexual debut among individuals in this age group. The relationship can also be the other way i.e. fertility can lead to increased chances of HIV infection. In settings where infertility or sub-fertility is prevalent and fertility is highly valued, individuals might engage in unprotected sex with many partners in the hope of having a child with one of them (Setel 1995). This in turn exposes them to the risk of HIV infection.

This study contributes to this literature by examining the sexual and reproductive experiences and intentions of adolescents perinatally infected with HIV who knew their sero-status and those in the general population who reported that they had never been tested for HIV or that they had been tested but they did not obtain their test results. We specifically examine whether compared to adolescents in the general population who did not know their HIV status, those who were perinatally infected with HIV and knew their sero-status were less or more likely to: 1) have had sex, 2) have used a method to prevent HIV infection, re-infection, and/or pregnancy, 3) have ever been pregnant or to have had sex that resulted in pregnancy, 4) have children, and 5) have the intention of getting children in future. Based on the literature reviewed above, we should expect the differences between the two groups of adolescents to be either way.

By exploring these questions, we by no means lay claim to providing the ultimate resolution to the debates about the relationship between HIV/AIDS on the one hand and sexual

activity and fertility on the other. We believe that these debates are likely to continue since, as Setel (1995, p.179) argues, the relationship can be 'seen in terms of a tightly knit continuum of biological, epidemiologic and cultural contexts, and the prevailing conditions of response to the epidemic.' This suggests that studies from different contexts are likely to come up with different conclusions. The present study therefore examines this relationship in the context of Uganda, a country that was once characterized by high HIV prevalence but which has been touted as a showcase in HIV prevention efforts, though this is itself subject to debate (see, for instance, Allen 2006).

Data sources

The data for this study come from two sources: the Population Council Study (PCS) conducted in 2007 and the Uganda Demographic and Health Survey (UDHS) conducted in 2006.

Population Council Study (PCS)

The Population Council project was conducted in four districts in Uganda, namely, Kampala, Wakiso, Masaka, and Jinja. Its overall aims were to better understand the notions of sexuality among HIV-positive adolescents aged 10-19 years, identify gaps in sexual and reproductive health (SRH) information and services for this group, and identify and develop interventions that integrate SRH issues into HIV/AIDS treatment, care, and support programs for the adolescents (TASO and Population Council 2007). Sexuality in this context was broadly defined to encompass not only sexual experiences and practices but also desires, beliefs, values, anxieties and fears surrounding such experiences/practices. The project involved quantitative interviews with a sample of 732 HIV-positive adolescents aged 15-19 years who were aware of their HIV sero-status, seven focus group discussions with another 48, and in-depth interviews and

ethnographic case stories with another 12, four of whom participated in the survey. The study participants were identified and recruited through the existing HIV/AIDS treatment, care, and support programs/centres in the four districts. Nine of these centres/facilities were in Kampala, six in Jinja, three in Masaka, and two in Wakiso district.

The study obtained ethical clearance from the Internal Review Board of The AIDS Support Organization (TASO)- Uganda, the Uganda National Council of Science and Technology (UNCST), and the Population Council Ethical Research Review Committee. The management of the centres/facilities granted the research team access to the client registers. The data clerks/officers at the centres/facilities assisted with identifying clients aged 15-19 years and from these, the counsellors identified those clients who were presumed to be (i.e., those who have been living with HIV since infancy) or recorded as perinatally infected with HIV and who knew their sero-status. For respondents aged 15-17 years who had parents/guardians, informed consent to participate in the study was sought at two levels: from their parents/guardians and then from the adolescents themselves. Respondents aged 15-17 years without parents/guardians and those aged 18-19 years provided individual consent only[1].

The study also involved in-depth interviews with four purposively selected counsellors, one from each of the four districts, to obtain some insights on provider perspectives regarding SRH counselling and services for HIV-positive adolescents. In addition, a stakeholder analysis was also undertaken using unstructured interview questions administered to 23 key informants from governmental institutions, private organizations, non-governmental organizations, health development partners and technical assistance agencies in Uganda. The interviews focused on

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[1] The Ugandan constitution considers individuals aged 18 years and above as adults who can grant consent to participate in a research study. In addition, the Uganda National Council of Science and Technology allows those aged below 18 years and who do not have parents/guardians to grant such consent provided that they are thoroughly informed about the risks involved.

the availability of national and institutional policy guidelines on adolescent SRH, the content of training on counselling and services, how broad SRH concerns of HIV-positive adolescents are handled within existing services, and whether existing programs have the capacity to handle SRH concerns of HIV-positive adolescents.

This study relies on the quantitative interviews with the HIV-positive adolescents. A total of 740 HIV-positive adolescents were identified for the interviews but two refused to participate while six participated but did not complete the interviews. The reasons for not completing the interviews included the inability of the respondent to continue because of feebleness resulting from breakdown as well as doubts about the respondent's peri-natal infection status. A structured questionnaire was used to collect information ranging from basic socio-demographic characteristics to access to information and support services for the HIV-positive adolescents, sexual behaviour and desires, knowledge and use of preventive methods for HIV re-infection and pregnancy, pregnancy and childbearing experiences and intentions, and issues of self-esteem, worries, sexual and physical violence. In this study, we focus on sexual behaviour, use of preventive methods, and pregnancy and childbearing experiences and intentions.

Uganda Demographic and Health Survey (UDHS)

The UDHS comprised a nationally-representative probability-based sample of men and women of reproductive age. The sample was identified in two stages. The first stage involved a selection of 321 clusters from a list of clusters sampled in the 2005-2006 Uganda National Household Survey (UNHS), 17 clusters from the 2002 Census for Karamoja District, and 30 internally displaced persons camps from a list of camps compiled by the United Nations Office for the Coordination of Human Affairs (UBOS and ORC Macro 2007). In the second stage, a sample of

9,864 households was selected from these primary sampling units; interviews were conducted in 98 per cent of these households (UBOS and ORC Macro 2007). All women aged 15-49 years who were either permanent residents or visitors present in the selected households on the night before the survey were eligible for interviews. A total of 9,006 women were eligible and interviews were conducted with 95 per cent of them (UBOS and ORC Macro 2007). In addition, in one-third of all the selected households, all men aged 15-54 years were eligible to be interviewed if they were either permanent residents or visitors present in the household on the night before the survey. From a total of 2,760 eligible men, 91 per cent were interviewed (UBOS and ORC Macro 2007).

Information was collected on basic socio-demographic characteristics, sexual activity, fertility experiences and intentions, awareness and use of family planning methods, maternal and child health, mortality, as well as on awareness and behaviour regarding HIV/AIDS and other sexually transmitted infections. Similar to the PCS, we focus on sexual activity, fertility experiences and intentions, and the use of methods to prevent pregnancy and HIV infection among male and female respondents aged 15-19 years. Unlike the PCS, however, the UDHS sample for this analysis excludes those adolescents who reported that they had taken an HIV test before and that they obtained their test results i.e. those who knew their sero-status. Out of 8,531 women aged 15-49 years who were interviewed, 1,948 (23 per cent) were aged 15-19 years and 274 (14 per cent) of these reported having been tested and obtaining the test results. A total of 2503 men aged 15-54 years were interviewed, 582 (23 per cent) were aged 15-19 years, and 43 (7 per cent) of these reported that they had been tested for HIV and that they obtained their test results.

Methods of analysis

We use three approaches to compare the sexual and reproductive experiences and intentions of the two groups of adolescents. The first approach is a simple comparison of means and proportions together with the relevant significance tests, that is, the *student's t-test* for means and significance tests of proportions. We begin by comparing the basic socio-demographic characteristics of the two groups (*age*, *sex*, and *current marital status*). Next, we consider whether they are significantly different from each other with respect to sexual activity and contraceptive use. This includes the proportion that had ever had sex, and among those who had, the mean age at first sex, the proportion that used a method to prevent HIV infection, re-infection, and/or pregnancy at first sex, the proportion that had ever used a contraceptive method, and the proportion currently using condoms. We then examine differences in terms of pregnancy and childbearing experiences and intentions, that is, the proportion that had ever been pregnant or had had sex that resulted in pregnancy, the proportion with at least one living child, the proportion that intends to have children in future and how soon, as well as the mean number of desired children.

The second approach involves a life-table analysis of age at sexual debut among those who had ever had sex. The purpose is to obtain and compare: 1) the life-table probabilities of having had sex between exact age x and $x+n$ where n is the interval length between two exact ages, and 2) the expected number of years remaining before sexual debut at each age among those who had ever had sex between the two groups of adolescents. The age distribution in the life-table is in single years and starts at exact age five (the earliest age at first sex recorded in one of the two datasets used) and ends at exact age 20. The analysis assumes that sexual debut occurred half-way through the interval between exact age x and $x+n$. Separate analyses are done

for male and female respondents. The life-table notations, computations, and interpretations are presented in Table 1.

It might be rightly argued that any differences between the two groups of adolescents are due to differences in their age and sex compositions. The third analytic approach, standardization, therefore aims at examining if this is case. In particular, we compute new proportions for the PCS respondents based on the UDHS age and sex distributions as the standard. We then test whether the new proportions are significantly different from what was observed for the PCS and the UDHS respondents. The standardization procedure is given by equation [1]:

$$SP \quad = \quad \sum_{i=1}^{n} P_i^{j} \times C_i^{s} \qquad\qquad [1]$$

where *SP* is the proportion standardized for age or sex, P_i^{j} is the age- or sex-specific proportion in the PCS, and C_i^{s} is the age or sex distribution in the UDHS (the standard population).

Standardization for age composition entails computing new proportions for those who had ever had sex, used a method to prevent HIV infection, re-infection, and/or pregnancy at first sex, used a contraceptive method, or were using condoms at the time of the survey among male and female respondents respectively. For female respondents only, we compute new proportions for those who had ever been pregnant, had at least one living child, intended to have children in future, or intended to do so later in life. Various UDHS age distributions are used in the standardization procedures. For instance, the age distribution of all respondents included in the analysis (by sex) is used in computing new proportions of PCS respondents that had ever had sex

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and, for female respondents only, the proportion that intended to have children in future. The age distribution of those who had ever had sex is used in computing new proportions in the PCS that: 1) used a preventive method at first sex, 2) ever used a contraceptive method, 3) was currently using condoms, and 4) had ever been pregnant (females only). Finally, the female age distributions of those who had ever been pregnant and those who had no living children are used in computing the new proportions of female PCS respondents that had at least one living child and that intended to have children later respectively.[2]

Standardization for sex composition, on the other hand, involves using the UDHS sex distribution to compute new proportions of combined male and female PCS respondents that: 1) had ever had sex, 2) used a preventive method at first sex, 3) ever used a contraceptive method, and 4) were currently using condoms. Similar to the age distribution, the UDHS sex composition for all respondents included in the analysis was used in the first standardization procedure while for the remaining instances, the sex composition of respondents who had ever had sex was used.

Results

Comparisons of un-standardized means and proportions

The results of the comparison of the two groups of adolescents in terms of their socio-demographic characteristics (*age*, *sex*, and *current marital status*) are presented in Table 2. Whereas there is no significant difference in the mean ages of the two groups, this masks the significant differences in the distribution across ages. In particular, significantly more PCS than UDHS respondents were aged 15 and 18 years while significantly more UDHS than PCS respondents were aged 16 and 17 years. There was, however, no significant difference between

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[2] The use of the female age distribution for those who had no living children was guided by the way the question about timing of future childbirth was asked in the PCS, that is, whereas the intention to have children was asked of all respondents, the timing was asked of only those respondents who did not have living children.

the two groups in the proportion aged 19 years. In addition, the proportion of male respondents in the PCS was significantly higher than that of UDHS while the proportion of female respondents in the UDHS was significantly higher than that in the PCS. Furthermore, a significantly higher proportion of female respondents in UDHS compared to the PCS were married or living together at the time of the survey. This implies, as alluded to earlier, that differences between the two groups could partly be attributed to the differences in their socio-demographic compositions.

<Table 2 about here>

With respect to sexual activity and contraceptive use among male adolescents, there was no significant difference between the two groups in terms of: 1) the proportion of respondents that had ever had sex, 2) the mean age at first sex, or 3) the proportion that used a preventive method at first sex (Table 3). However, a significantly higher proportion of male PCS respondents reported ever use of a contraceptive method and current condom use compared to their counterparts in the UDHS. In contrast, a significantly higher proportion of female UDHS than PCS respondents reported having had sex. Similarly, the mean age at first sex among female UDHS respondents was significantly higher than that of their counterparts in the PCS. Nonetheless, a significantly higher proportion of female PCS than UDHS respondents reported the use of a preventive method at first sex as well as current condom use. Despite the fact that, on average, adolescents perinatally infected with HIV who were aware of their sero-status reported having sex at younger ages than those in the general population, the differences in use of preventive methods might, perhaps, suggest more careful sexual behaviour on their part.

<**Table 3 about here**>

Table 4 presents the results of the comparison of the two groups of adolescents in terms of their pregnancy and childbearing experiences and intentions. Whereas a significantly higher proportion of male respondents in the PCS than in the UDHS reported having had sex that resulted in a pregnancy, a significantly higher proportion of female respondents in the UDHS than in the PCS reported having been pregnant. Among female respondents who had been pregnant, a slightly higher proportion of those in the UDHS compared to those in the PCS reported having at least one living child. This is consistent with the differential mortality of children by mothers' HIV status-- children of HIV-positive mothers are likely to experience high mortality if the virus was passed on to them. The difference is, however, not statistically significant, perhaps due to the small number of female respondents in the PCS who had ever been pregnant. It is worth noting that the difference becomes statistically significant if we consider the proportion of respondents with at least one living child among respondents who had ever had sex (Table 4).

<Table 4 about here>

The results in Table 4 further show that a significantly higher proportion of female respondents in the UDHS compared to their counterparts in the PCS intended to have children in future. In addition, among female respondents without children, the average number of desired children was significantly higher in the UDHS than in the PCS. These results might be consistent with the notion that HIV/AIDS could result in low fertility among HIV-positive women not only through reduced physical capacity to conceive and give birth but also through reduced desires to have children. The assumption here is that such women would live to realize their fertility desires. However, fertility desires may change with time while the ability to realize them might also be affected by the socio-economic and cultural environment that could impact on the

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women's ability to make decisions concerning their fertility. This notwithstanding, still a substantial proportion of male (91 per cent) and female (80 per cent) respondents in the PCS desired to have children in future except that compared to their counterparts in the UDHS, most of them desired to have children later in life (Table 4).

Life-table analysis

Despite the results in the previous section, especially among female respondents, indicating significant differences in the proportion that had ever had sex and in the mean age at first sex between the two groups of adolescents, the results of life-table analysis show no huge differences in the probability of sexual debut at each age (Figures 1a-b). Perhaps the only noticeable difference is that among male respondents aged 17 years and above, the probability of having first sex is higher in the PCS than in the UDHS. It is also interesting to note that for both groups of adolescents, the probability of having first sex begins to increase from age 13 for male and age 12 for female respondents respectively, a further indication that the age patterns of sexual debut among the two groups of adolescents are almost similar.

<Figures 1a-b about here>

Similarly, there is no much difference in the expected number of years at each age before sexual debut between the two groups of adolescents who had ever had sex. At five years of age, for instance, the expected number of years before sexual debut for male PCS and UDHS respondents are 9.9 and 10.0 years respectively. The corresponding figures for female respondents are 10.1 and 10.8 years respectively. These figures correspond to the life-table mean ages at first sex of 14.9 and 15.0 years for male respondents and 15.1 and 15.8 years for female

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respondents in the PCS and UDHS respectively, and are very close to the mean ages at first sex observed in the data (see Table 3).

<Figures 2a-b about here>

Age and sex compositional effects

As noted before, there are significant differences in the age and sex compositions of the two samples of adolescents which could partly account for any differences observed by simply comparing the un-standardized means and proportions from the two groups. In this section, we present the results of the analysis involving standardization which aimed at examining how the PCS proportions would change assuming the age and sex distributions of the UDHS. In most cases, standardization for either age or sex results in proportions that are lower than what was observed in the PCS (Table 5). However, in nearly all cases, the differences between the standardized and the observed (PCS) proportions are not statistically significant. The exception is the proportion of female respondents who had ever been pregnant among those who had ever had sex for which standardization for age results in a significantly lower proportion than what was observed.

<Table 5 about here>

The comparison of the standardized PCS and the observed UDHS proportions, on the other hand, presents a mixed a mixture. One the one hand, changes in the PCS proportions due to standardization for age or sex result in lack of significant difference between the two groups when such differences were statistically significant for the un-standardized proportions. Examples include the proportions of: 1) male respondents reporting ever use of a contraceptive method, 2) combined male and female respondents reporting ever use of a contraceptive method,

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3) female respondents reporting using a preventive method at first sex, and 4) female respondents intending to have children in future. On the other hand, the changes still leave the differences between two groups statistically significant. These include the proportions of: 1) combined PCS respondents reporting using a preventive method at first sex, 2) male and female respondents reporting current condom use, 3) female respondents reporting having had sex, 4) female respondents reporting having been pregnant, and 5) female respondents who do not have children and who reported that they intended to have children later in life.

Discussion, implications, and conclusions

The relationship between HIV/AIDS on the one hand and sexual activity and fertility on the other is a complex one, and thus continues to attract interest in the literature especially with respect to how one affects the other. Nonetheless, there is suggestion that the complexity of the relationship could be a function of context involving the interplay between biological, epidemiologic and cultural factors as well as the nature of response to the epidemic (Setel 1995). The purpose of this study was to contribute to this literature by comparing the sexual and reproductive experiences and intentions of adolescents perinatally infected with HIV who knew their sero-status to those of adolescents in the general population who did not know their HIV status using data from Uganda. One interesting finding is that among those who had ever had sex, both groups of adolescents had almost similar probabilities of having first sex and similar expected years before sexual debut at each age. This is indicative of the pressure to have sex among young people in general and implies that for this segment of the population, knowing that one is HIV-positive has no impact on sexual debut. Indeed, qualitative interviews with the adolescents perinatally infected with HIV showed a general feeling among them that having sex

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is unavoidable (Birungi et al., Forthcoming). The finding further implies that chances of spreading the virus are high especially if sex among those who are already infected is unprotected and takes place with HIV-negative (discordant) partners.

The second interesting finding is that even after accounting for the differences in the age and sex compositions of the two groups of adolescents, a significantly lower proportion of female respondents who were perinatally infected with HIV compared to those in the general population had ever been pregnant. This could suggest three things. First, it could be due to the fact that a significantly lower proportion of the former than the latter group of female adolescents had ever had sex. These differences (in the proportion of female respondents who had ever had sex) remained statistically significant even after accounting for the differences in the age distributions of the two groups of adolescents, and could therefore partly account for the differences in the proportion that had ever been pregnant. Second, the differences between the two groups of adolescents in terms of pregnancy experiences could partly be due to the reduced capacity to conceive as a result of HIV infection among those living with the virus. This is one mechanism identified in the literature through which HIV/AIDS can affect fertility (Setel 1995; Ntozi 2002). Third, the differences could also be partly due to higher chances of using a preventive method among those perinatally infected with HIV than among those in the general population. The results show, for instance, that even after accounting for the differences in the age distribution of the two groups of adolescents, the proportion reporting current condom use was significantly higher among those perinatally infected with HIV than among those in the general population.

We further find that after taking into account differences in the age distribution between female adolescents perinatally infected with HIV and those in the general population, there is no

significant difference between the two groups in the proportion of respondents that intend to have children in future. Nonetheless, among female respondents who did not have children and who indicated that they intend to have them in future, the majority of those perinatally infected with HIV intended to have children later in life. In contrast, among those in the general population, the majority were undecided or unsure about the timing. Furthermore, the differences between the two groups with respect to the intended timing of future childbirth remained statistically significant even after accounting for differences in the age distribution. The implication of these findings is that unlike the age patterns of sexual debut that suggested some kind of pressure to have sex among the adolescents, differences in the reproductive intentions do not suggest any immediate pressure on the part of HIV-positive adolescents to have children compared to their counterparts in the general population. This could have been expected if the effect of HIV/AIDS was to increase fertility desires and intentions among young people perinatally infected with HIV relative to those in the general population, which in turn could have suggested that HIV-positive adolescents are under pressure to have children or replace those who have died before they themselves pass on.

The fourth finding of the study to the effect that a significantly higher proportion of adolescents perinatally infected with HIV reported current condom use or ever use of a method (combined male and female respondents), even after accounting for differences in the age and sex compositions of the two groups, seems encouraging. However, since the adolescents perinatally infected with HIV stand the greatest chance of spreading the virus and given that they already know their sero-status, one would have expected universal use of methods to prevent HIV infection, re-infection and/or pregnancy, which is not the case. Moreover, despite the differences between the two groups, both quantitative and qualitative evidence showed that the

adolescents perinatally infected with HIV did not consistently use condoms (Birungi et al. 2008). For instance, among those who were currently in a relationship, less than half reported always using condoms. Thus, whereas the level of condom use seems to suggest that knowing that they are HIV-positive might have resulted in more careful behaviour among adolescents living with the virus, the frequency of use suggests that this might not be the case.

Two major conclusions can thus be drawn from these findings. First, it appears that HIV/AIDS could not have positively modified the sexual behaviour of adolescents who were perinatally infected with the virus in a way that makes their behaviour different from that of those in the general population. This poses a challenge for HIV prevention programs. Rather than encourage HIV-positive young people to refrain from sexual activity (TASO and Population Council 2007), programs need to acknowledge that these young people do also engage in sex. The challenge therefore is how to ensure that they enjoy their sexual lives without spreading the virus further. This can be achieved by incorporating sexual and reproductive health counselling and services into the existing HIV/AIDS care, treatment, and support services. The second conclusion to be drawn from the study is that whereas HIV/AIDS seems to have some effect on the survival of children of infected adolescents as would be expected, it does not seem to raise their fertility intentions and desires relative to the adolescents in the general population. Rather, compared to the adolescents in the general population, HIV-positive adolescents on average desired fewer children and intended to have those children later in life. This suggests that in the long-term, HIV/AIDS might lead to lower fertility among this group compared to their counterparts in the general population since by the time they are ready to have children, their capacity to conceive might already be impaired by the virus.

Finally, it is important to note that these findings and conclusions might be affected by the study's limitations. To begin with, differences between the two groups of adolescents in terms of sexual and reproductive experiences and intentions could also be affected by differences in the time of the survey. However, since the two surveys were conducted roughly one year apart, it is unlikely that the short duration could witness huge changes in the indicators of interest. Second, whereas it would have been desirable to extend the life-able analysis to age at first birth or at first pregnancy, the PCS did not collect this information. Third, the life-table analysis only captures the experiences of those who had first sex by age 19. The age patterns of sexual debut among those who had not had sex by then could be different for the two the groups of adolescents. Fourth, the reporting of sexual behaviour has been found to be problematic with male respondents over-reporting and female respondents under-reporting on their experiences (Buvé et al. 2001; Curtis and Sutherland 2004; Eggleston et al. 2000; Fenton et al. 2001; Mensch et al. 2003). However, as long as the reporting error by sex was in the same direction in both surveys, this is not likely to greatly affect the comparison of the two groups. It could, however, pose serious limitations to the study if, for instance, male adolescents in the PCS tended to under-report while those in the UDHS tended to over-report on their experiences. Finally, the study does not differentiate whether first sex was consensual (both partners willing) or otherwise. Whereas the PCS collected information on the circumstances of first sex, the UDHS did not. Thus, for comparability purposes, the study focused on all those who had ever had sex regardless of whether it was consensual or not.

Acknowledgements

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Table 1: Life-table notations, computations, and interpretations for the analysis of age at sexual debut

Notation	Computation	Interpretation
x	Ranges from 5 to 20 years	Age at sexual debut- exact age at the beginning of the interval
n	$n = 1$	The length of interval between exact age x and the next $(x+n)$
$_n d_x$	Observed from the data	The number of individuals who had first sex between ages x and $x+n$
l_x	$l_{x+n} = l_x - {_n}d_x$	The number of individuals who had not had sex by the beginning of age x
$_n a_x$	$_n a_x = n/2$	Average person-years lived before sexual debut between ages x and $x+n$ by those who had first sex within the interval
$_n q_x$	$_n q_x = {_n}d_x / l_x$	The probability of having first sex between ages x and $x+n$
$_n L_x$	$_n L_x = (n \times l_{x+n}) + ({_n}a_x \times {_n}d_x)$	Person-years lived before sexual debut between ages x and $x+n$
T_x	$T_x = \sum_{i=1}^{16} {_n}L_x$	Person-years lived before sexual debut above age x
e_x	$e_x = T_x / l_x$	Expected years before sexual debut for persons aged x

Note: Of interest are the $_n q_x$ and e_x values.

Table 2: Comparison of the PCS and the UDHS respondents by socio-demographic characteristics, PCS 2007 and UDHS 2006

Characteristics	Male		Female		Both sexes	
	PCS	UDHS	PCS	UDHS	PCS	UDHS
Mean age (years)	16.8	16.7^{ns}	16.7	16.7^{ns}	16.7	16.7^{ns}
Age in single years (%)						
15	34.6	27.1^{*}	32.9	26.4^{**}	33.5	26.6^{**}
16	14.1	20.0^{*}	17.3	23.4^{**}	16.1	22.6^{**}
17	8.4	22.1^{**}	9.8	17.8^{**}	9.3	18.8^{**}
18	25.5	16.1^{**}	23.1	17.6^{**}	23.9	17.3^{**}
19	17.5	14.7^{ns}	16.9	14.8^{ns}	17.1	14.7^{ns}
Percent married/living together	1.5	1.9^{ns}	2.4	16.0^{**}	2.1	12.5^{**}
Number of respondents	263	539	469	1,674	732	2,213
Percent of total respondents	35.9	24.3^{**}	64.1	75.7^{**}	100.0	100.0

Note: PCS- Population Council Study; UDHS- Uganda Demographic and Health Survey; Differences between PCS and UDHS means/proportions are significant at: *p<0.05; **p<0.01; ns- not significant.

Table 3: Comparison of the PCS and the UDHS respondents by sexual activity and contraceptive use, PCS 2007 and UDHS 2006

Characteristics	Male		Female		Both sexes	
	PCS	UDHS	PCS	UDHS	PCS	UDHS
Percent ever had sex	37.3	35.3[ns]	30.7	36.2[*]	33.1	36.0[ns]
	(N=263)	(N=536)	(N=469)	(N=1,673)	(N=732)	(N=2,209)
Mean age at first sex (years)						
Among those who had ever had sex	14.4	14.5[ns]	14.6	15.3[**]	14.5	15.1[**]
	(N=98)	(N=189)	(N=139)	(N=606)	(N=237)	(N=795)
Among those who had consensual first sex	14.6	n/a	15.4	n/a	15.0	n/a
	(N=87)		(N=87)		(N=174)	
Used a preventive method/ condom at first sex (%)	34.7	27.0[ns]	37.5	28.2[*]	36.4	27.9[*]
	(N=98)	(N=189)	(N=144)	(N=606)	(N=242)	(N=795)
Ever used a contraceptive method in current/ previous relationship (%)	58.2	43.9[*]	43.8	39.8[ns]	49.6	40.8[*]
	(N=98)	(N=189)	(N=144)	(N=606)	(N=242)	(N=795)
Percent currently using a condom among those who had ever had sex	50.0	25.4[**]	45.1	6.6[**]	47.1	11.1[**]
	(N=98)	(N=189)	(N=144)	(N=606)	(N=242)	(N=795)

Note: PCS- Population Council Study; UDHS- Uganda Demographic and Health Survey; n/a- not applicable because the condition for first sex was not asked; Differences between PCS and UDHS means/proportions are significant at: [*]$p < 0.05$; [**]$p < 0.01$; ns- not significant.

Table 4: Comparison of the PCS and the UDHS respondents by pregnancy and childbearing experiences and intentions, PCS 2007 and UDHS 2006

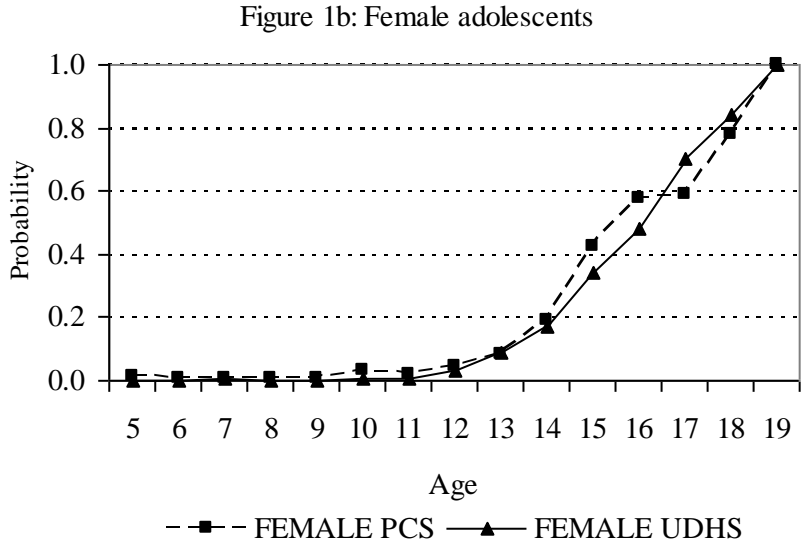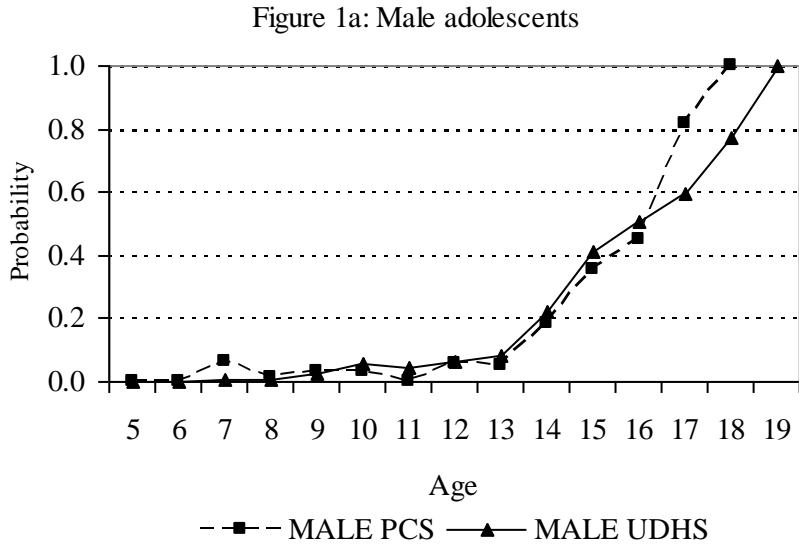| Characteristics	Male		Female		Both sexes	
	PCS	UDHS	PCS	UDHS	PCS	UDHS
Ever had/caused pregnancy (%)						
All respondents	6.1	2.4**	12.8	20.4**	10.4	16.0**
	(N=263)	(N=539)	(N=469)	(N=1,674)	(N=732)	(N=2,213)
Sexually active respondents	16.3	6.9*	41.0	55.6**	31.0	44.0**
	(N=98)	(N=189)	(N=144)	(N=606)	(N=242)	(N=795)
Has at least one living child (%)						
All respondents	2.7	1.7^{ns}	8.5	14.3**	6.4	11.2**
	(N=263)	(N=539)	(N=469)	(N=1,674)	(N=732)	(N=2,213)
Sexually active respondents	7.1	4.8^{ns}	27.8	38.8*	19.4	30.7**
	(N=98)	(N=189)	(N=144)	(N=606)	(N=242)	(N=795)
Ever had/caused pregnancy	43.8	71.4^{ns}	66.7	71.6^{ns}	61.8	71.6^{ns}
	(N=16)	(N=14)	(N=60)	(N=490)	(N=76)	(N=504)
Intention to have children in future						
All respondents (%)	91.3	n/a	79.7	84.1*	83.9	n/a
	(N=263)		(N=469)	(N=1,674)	(N=732)	
Ever had/caused pregnancy	87.5	n/a	66.7	85.6**	71.1	n/a
(%)	(N=16)		(N=60)	(N=339)	(N=76)	
Has no child/children (%)	91.4	n/a	81.1	84.1^{ns}	85.0	n/a
	(N=256)		(N=429)	(N=1,435)	(N=685)	
How soon those without children intend to have them (%)	(N=256)	n/a	(N=429)	(N=1,435)	(N=685)	n/a
Very soon/within 2 years	1.6	n/a	6.5	6.5^{ns}	4.7	n/a
Later in life/2 years or more	79.3	n/a	67.6	35.3**	72.0	n/a
Undecided/unsure timing	7.8	n/a	4.0	42.4**	5.4	n/a
Missing	11.3	n/a	21.9	15.8**	18.0	
Mean number of desired children	3.7	n/a	2.8	4.2**	3.2	n/a
among those without children^{a}	(N=230)		(N=348)	(N=1391)	(N=578)	

Note: ^{a}UDHS means exclude non-numeric responses such as "up to God"; PCS- Population Council Study; UDHS- Uganda Demographic and Health Survey; n/a- not applicable because the questions were not asked in a manner that would be comparable to PCS respondents; Differences between PCS and UDHS means/proportions are significant at: *p<0.05; **p<0.01; ns- not significant.

Table 5: Comparison of age- and sex-standardized proportions of PCS respondents with observed PCS and UDHS proportions, PCS 2007 and UDHS 2006

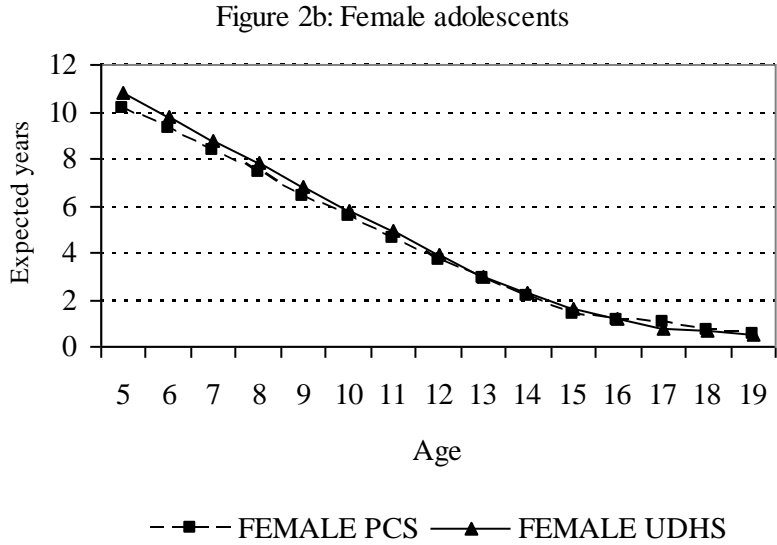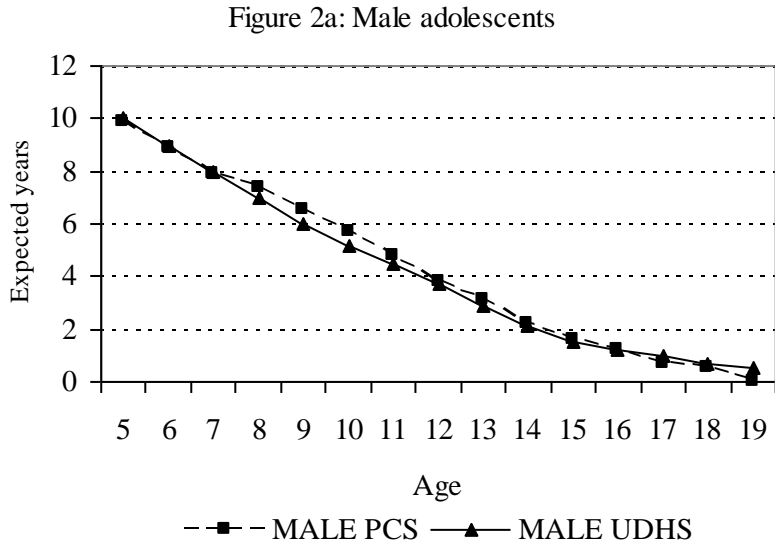| Sexual/reproductive experiences and intentions	Age Standardization						Sex standardization		
	Male respondents			Female respondents			Both sexes		
	Adjusted (PCS) (%)	Adjusted - Observed (PCS)	Adjusted - Observed (UDHS)	Adjusted (PCS) (%)	Adjusted - Observed (PCS)	Adjusted - Observed (UDHS)	Adjusted (PCS) (%)	Adjusted - Observed (PCS)	Adjusted - Observed (UDHS)
Ever had sex	34.1	-3.2^{ns}	-1.2^{ns}	29.9	-0.8^{ns}	-6.3^{*}	32.3	-0.8^{ns}	-3.7^{ns}
Used a preventive method at first sex	35.2	0.5^{ns}	8.2^{ns}	35.3	-2.2^{ns}	7.1^{ns}	36.8	0.4^{ns}	8.9^{**}
Ever used contraception	55.0	-3.2^{ns}	11.1^{ns}	39.6	-4.2^{ns}	-0.2^{ns}	47.2	-2.4^{ns}	6.4^{ns}
Currently using condoms	48.0	-2.0^{ns}	22.6^{**}	41.3	-3.8^{ns}	34.7^{**}	46.3	-0.8^{ns}	35.2^{**}
Ever been pregnant	n/a	n/a	n/a	33.3	-7.7^{*}	-22.3^{**}	n/a	n/a	n/a
Has at least one living child	n/a	n/a	n/a	59.2	-7.5^{ns}	-12.4^{*}	n/a	n/a	n/a
Intends to have children in future	n/a	n/a	n/a	80.5	0.8^{ns}	-3.6^{ns}	n/a	n/a	n/a
Intends to have children later	n/a	n/a	n/a	64.8	-2.8^{ns}	22.9^{**}	n/a	n/a	n/a

Note: PCS- Population Council Study; UDHS- Uganda Demographic and Health Survey; n/a- not applicable because standardization was done for female respondents only; *p<0.05; **p<0.01; ns- not significant.

Figures 1a-b: Life-table probabilities of having had sex by age among male and female adolescents, PCS 2007 and UDHS 2006

Figure 1a: Male adolescents

Figure 1b: Female adolescents

Note: PCS- Population Council Study; UDHS- Uganda Demographic and Health Survey.

Figures 2a-b: Expected years before sexual debut by age among male and female adolescents, PCS 2007 and UDHS 2006

Figure 2a: Male adolescents

Figure 2b: Female adolescents

Note: PCS- Population Council Study; UDHS- Uganda Demographic and Health Survey.