

**Do women with complications of an incomplete abortion have different HIV  
infection status than women without complications?**

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**Abstract**

Do women with complications of an incomplete abortion have different HIV infection status than women without complications?

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**Purpose:** Little is known about the status of HIV among women who have had abortions and even less about women who have suffered from abortion complications. Understanding this connection is critical for building the evidence base and for guiding strategies to manage the sexual and reproductive health needs of women living with HIV. The purpose of this research is to assess if HIV infection status differed between women who suffered incomplete abortion complications and those who visited the hospital for other obstetric needs.

**Methods:** The analysis used a secondary dataset from a published case-control study that enrolled 1) women at discharge after receiving in-patient care for complications resulting from induced abortion, and 2) women (the comparison group) who visited the same hospital during

the same time period for other obstetric needs. Unadjusted and adjusted associations between being in the abortion complications group, HIV status and other selected population characteristics were estimated using univariate and multivariate logistic regression.

**Results:** Compared to women who were HIV negative, women who were HIV positive had similar odds of being in the abortion complications group in both univariate and multivariate analyses ( $p = 0.62$  and  $p = 0.76$ ). However, compared to HIV-negative women, those women who did not know their HIV status had greater odds of being in the abortion complications group (OR=3.8, 95% CI, 1.88, 8.20) in univariate analysis. After adjusting for potential confounding variables, the odds of being in the abortion complications group remained greater among women who did not know their HIV status compared to HIV-negative women (adjusted OR = 2.8, 95% CI, 1.20, 6.54).

**Conclusions:** Compared to HIV-negative women, HIV-positive women had similar odds of being in the abortion complications group. However, not knowing one's HIV status resulted in approximately three-fold higher odds of being in the abortion complications group compared to being HIV negative, pointing to the need for targeted interventions aimed at strengthening the delivery and coverage of HIV-testing programs for pregnant women and post-abortion care. In addition, further research examining the linkages between HIV and reproductive health is strongly recommended.



## **Background**

According to World Health Organization (WHO), in the last decade, maternal deaths worldwide declined by 50%. Despite this decline, about 800 women die every day from preventable conditions associated with pregnancy and child birth. In 2010, 287,000 women died from conditions related to pregnancy and childbirth. And a large proportion (99%) of these deaths occurs in developing countries, with more than half in sub-Saharan Africa.

The maternal mortality rate in Uganda is among the highest in the world (S Singh et al., 2006). Three hundred and one maternal deaths occur for every 100,000 live births (UDHS, 2011; U. WHO, UNFPA and The World Bank estimates., 2012). This translates into about 4,700 pregnant women or new mothers dying annually from preventable causes (U. WHO, UNFPA and The World Bank estimates., 2012). It is known that complications during pregnancy and childbirth, such as severe hemorrhage, infection, hypertensive diseases, and unsafe abortion, are the leading causes of maternal mortality in the country (Countdown, 2012) .

### **Unsafe abortion**

Unsafe abortion is a leading cause of maternal deaths in Uganda, accounting for 26% of all maternal deaths in 2008 (Guttmacher, 2013) (MOH-Uganda). Figure 1 shows the proportion of maternal deaths due to unsafe abortion in Uganda (26%), East Africa (18%), and the world (13%) (WHO, 2011b). Yet the law in Uganda prohibits abortion except for saving the life or the physical and mental health of the mother (Uganda, 1950). The demand for abortion in Uganda is high because of the high rate of unintended or unwanted pregnancies (S. Singh, Prada, Mirembe, & Kiggundu, 2005; UDHS, 2011). One in two pregnancies in Uganda is unintended and about one in three of these pregnancies result in abortion (Guttmacher, 2013). In 2003, approximately

775,000 women, aged 15 to 49 years, had unintended pregnancies resulting in 297,000 abortions for an annual rate of 54 per 1000 (WHO, 2004) (Singh, et al., 2006). That same year, approximately 85,000 (29%) of women who had abortions suffered from abortion-related complications (S Singh et al., 2006).

Because abortion is illegal in Uganda except for reasons mentioned above, most abortions are carried out in a surreptitious manner by unskilled practitioners using unsafe techniques, putting women's health and life at risk (al., 2005; Institute, January 2012). Unsafe abortion results in lasting and devastating effects, including incomplete abortions (WHO, 2008). Usually, these complications require hospitalization and specialized medical attention, which further strains the country's limited health care resources (S. Singh et al., 2005).

In 2003, 1.5% of Ugandan women, aged 15 to 44 years, were hospitalized for abortion complications (S. Singh et al., 2005) (S. Singh, 2006). But this is most likely an underestimate: for every woman hospitalized for an abortion complication, several others have had unsafe abortions and developed complications but don't receive medical help or died before reaching the hospital (Susheela Singh, Prada, Florence, & Kiggundu, 2005). For instance, in 2010, more than 50,000 women in need of medical care for abortion complications were untreated (Vlassoff et al., 2014).

Unsafe abortion places a heavy burden on Uganda's health care system. In 2009, the cumulative projected national expenditure on induced abortion was \$64 million in societal costs (Babigumira et al., 2011) — more than 4% of Uganda's total annual health care expenditure of approximately \$1.5 billion (Karra & Gribble, 2012). In addition, the annual cost of post-abortion

care is about \$13.9 million (Vlassoff et al., 2014). Therefore abortion is a significant economic and public health problem in the Uganda.

### **Unintended Pregnancy and Unsafe abortion in the context of HIV**

HIV-positive women have rates of unintended pregnancy that are 51% to 90% higher than HIV-negative women in Côte d'Ivoire, South Africa, and Uganda (Manski, Dennis, Blanchard, Lince, & Grossman, 2012). This suggests that levels of abortion and complications from abortion may be equally as high among HIV-positive women.

Although HIV-positive women represent the majority of unintended pregnancies in Uganda, little is known about the prevalence of HIV among women who have had abortions and even less about women who have suffered from abortion complications. Understanding this connection is critical for building the evidence base for policy making, guiding strategies to manage HIV infection and unsafe abortion, and recognizing disparities in access to and delivery of post-abortion care by women with HIV.

In this paper, we describe the results of a study in which we compared the HIV-infection status of women with incomplete abortion complications to women seeking care at the same hospital for other obstetric needs. Using a cross-sectional, case-control design, we compared women who were treated for incomplete abortion complications at a local health facility in Uganda and women who visited the same facility for other obstetric needs. We hypothesized that women with incomplete abortion complications might have higher rates of HIV infection than women who attended clinic for other obstetric reasons.

## **Methods**

### **Design /Study Population/Participants**

We conducted a cross-sectional analysis of secondary data collected from a short-term observational cohort study. The study assessed the economic burden associated with induced abortions in Uganda (Babigumira et al., 2011). The data were collected from a case-control study conducted among women who attended the Obstetrics and Gynecology unit of Mbarara Regional Referral Hospital Uganda, between December 2009 and October 2010. The study population consisted of 139 women: 70 who enrolled at discharge after receiving in-patient care for complications resulting from induced abortion and 69 (the comparison group) who visited the same hospital during the same time period for other obstetric needs. All women enrolled in the study were above 18 years old and consented to the interview and follow-up (Lubinga et al., 2013).

### **Variables**

The primary outcome was seeking care for complications of incomplete abortion versus seeking care for other obstetric needs (dichotomous). The primary exposure variable was self-reported HIV status which was categorized into three groups: HIV positive, HIV negative, and HIV unknown.

Potential confounding variables included age, education, marital status, age of partner, education of partner, number of pregnancies, number of children, health status, and working status.

### **Statistical analysis**

All data were analyzed using SPSS Version 19.0. To facilitate our statistical analysis, continuous variables, i.e., age, age of partner, number of pregnancies, and number of children, were converted into categorical groups. Age was recoded into two categories: 18 to 29 years and 30 to 50 years. Age of partner was recoded into three categories: 18 to 35 years, 36 to 55 years

and unknown. Number of pregnancies was recoded into three categories: 1 to 2 pregnancies, 3 to 4 pregnancies, and 4 to 10 pregnancies. Number of children was recoded into three categories: 0 children, 1 to 3 children and 4 to 8 children. Categorical variables, i.e., education, education of partner, marital and health status, were recoded from their original groups into more logical categories for our analysis. We developed the coding by “collapsing” categories when the number of responses in one category was too large. Education was collapsed into four categories: (no education, primary school, secondary school, and higher than secondary school). Marital status was collapsed into two categories: (ever married and never married). Education of partner was collapsed into five categories; (no education, primary school, secondary school, higher than secondary school, and don’t know). Self-reported health status was collapsed into three categories: (excellent, good, and average/poor).

To control for outliers and maintain the full sample size, we winsorized age, education, partner age, partner education, HIV status, number of children, and number of pregnancies using the last value carried forward method to impute missing and extreme values.

Univariate logistic regression was used to determine the independent association between abortion complications and each variable unadjusted for other risk factors. We used backward stepwise elimination to identify variables to include in the multivariate logistic model. All independent variables showing an association ( $p < 0.1$ ) with abortion complications in the stepwise analysis were included in the multivariate logistic regression model. No variables included in the model were collinear.

### **Ethical review**

This study was approved by the Institutional Review Board of University of Washington. Since it was a secondary data research, information for the analysis could not be linked back to

individual subjects. Participants from the original study could not be individually identified or recognized.

## **Results**

Table 1 presents the demographic characteristics of the study population. A total of 139 women were enrolled in this study. Seventy (50.4%) women had abortion complications and 69 (49.6%) did not. Of the total study population, 18 (12.9%) were HIV positive, 50 (36.0 %) were HIV negative, and the HIV status of 71 women (51.1%) was unknown. More than half (56.1%) of the women were under the age of 29 years, and the majority (77.7%) of the women had ever been married.

### **Correlates of Abortion Complications**

Table 2 presents unadjusted and adjusted odds ratios for the association between being in the abortion complications group and selected population characteristics. In the univariate models, variables significantly associated with being in the abortion complications group were HIV status, marital status, number of children, and health status. Women who did not know their HIV status had an almost four times higher odds of being in the abortion complications group than women who were HIV negative (OR=3.8, 95% CI, 1.76, 8.23). Similarly, women who were never married had an almost four times higher odds of being in the abortion complications group compared to women who were ever married (OR=3.73, 95% CI, 1.53, 9.09). Having average to poor health compared to having excellent health increased the odds of being in the abortion complication group almost five-fold (OR=4.64, 95% CI, 1.48, 14.54). The odds of being in the abortion complications group were approximately 14 times greater for women with no children than for women with four or more children (OR = 13.95, 95% CI, 2.92, 66.73). Age, age of

partner, education, number of pregnancies, and work status were not significantly related to the odds of being in the abortion complications group.

Multivariate analysis showed independent associations between being in the abortion complications group and HIV, and number of children and health status (Table 2). After adjusting for the three variables, women who did not know their HIV status maintained almost three-fold higher odds of being in the abortion complications group compared to HIV-negative women (aOR= 2.80, 95% CI, 1.20, 6.54). The odds of being in the abortion complications group were over 17 times greater for women with no children compared to women with four or more children (aOR= 17.49, 95% CI, 3.17, 96.5). Women with average to poor health had almost seven times greater odds of being in the abortion complications group than women with excellent health (aOR= 6.77, 95% CI, 1.67, 27.49) and women with good health had almost five times greater odds of being in the abortion complications group compared to women with excellent health (aOR= 4.86, 95% CI, 1.53, 15.44).

## **Discussion**

In this study, we assessed the relationship between abortion complications and self-reported HIV status. We hypothesized that women with incomplete abortion complications would have higher rates of HIV infection than women who attended clinic for other obstetric reasons; however, the findings of this study failed to support the hypothesis.

The results of this study indicate that women seeking care for incomplete abortion complications had similar rates of HIV infection as women seeking care for other obstetric reasons. We found that HIV-positive and HIV-negative women had similar odds of having abortion complications.

One of the most striking findings was that, compared to HIV-negative women, women with unknown HIV status were at an increased risk of having abortion complications. We also found 36% of women who had abortion complications did not know their HIV status. This finding is unexpected and suggests that despite efforts to promote prenatal HIV counseling and testing in Uganda, many women are still not being tested (Byamugisha et al., 2010), (Wanyenze et al., 2008).

A possible explanation for this might be that women are hesitant to learn their status for fear of potential negative social consequences of a positive HIV test (Kaler & Watkins, 2010). Studies show that of HIV/AIDS-related stigma and discrimination continue to inhibit adequate response to HIV prevention and treatment efforts (Jürgensen, Tuba, Fylkesnes, & Blystad, 2012); (Duff, Kipp, Wild, Rubaale, & Okech-Ojony, 2010; Rujumba et al., 2012); (Kalichman & Simbayi, 2003).

Our study has some limitations. First, a major weakness of our study is the limited power to see differences between HIV-positive and negative women since there were so few HIV-positive women in the study. Second, a cross sectional, case-control study design cannot provide evidence of temporal relationship between exposure and outcome because the exposure and outcome are assessed simultaneously. That is to say that, even if a researcher determines that there is an association between exposure and outcome, there is generally no evidence to suggest that the exposure caused the outcome. Third, a cross sectional study estimates prevalence instead of incidence and, as a result, it does not account for subjects who acquire the outcome but die before the study. Consequently there may be a bias in data selection towards including subjects with more survivorship. Fourth, cross sectional studies are susceptible to bias due to low response and misclassification due to recall bias. In this case, bias due to low response and

misclassification may be introduced because of the secondary data analysis. The initial study (our data source) used self-reports to collect information on exposure status. However, the reliability and validity of the self-reports may be questionable (Weinhardt, Forsyth, P, Jaworski, & Durant, 1998). Given the fact that the truthfulness and accuracy of self-reported data may be compromised because some health risks, such as HIV status, are so sensitive that respondents may not want to accurately report them (Brener, Billy, & Grady, 2002). Finally, these data must be interpreted with caution: the study generalizability is limited by the sample size and sampled population, which consists of data on women who received medical care from a specific hospital (Mbarara University Hospital) in western Uganda.

The current findings add to the growing body of literature on unsafe abortion in Uganda and are useful for generating hypothesis and identifying associations that can be more thoroughly investigated in future studies.

## **Conclusion**

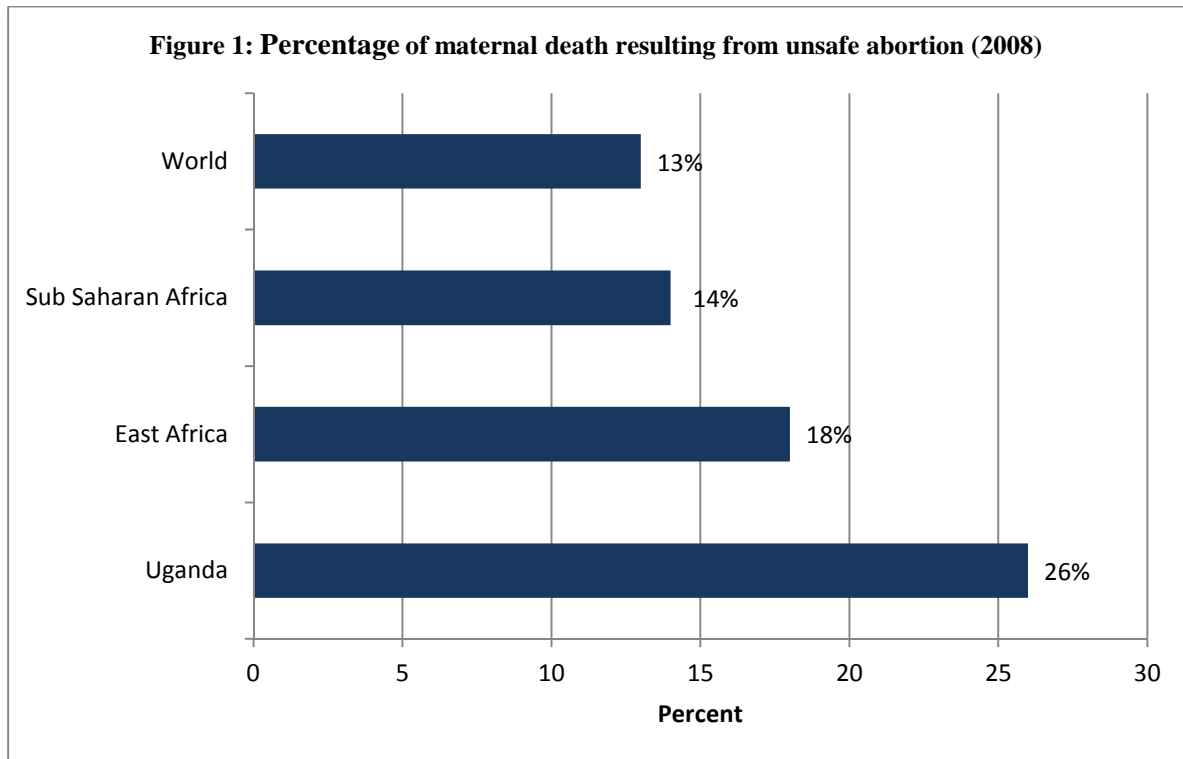
Women seeking care for incomplete abortion complications had a similar rate of HIV infection compared to women who attended clinic for other obstetric reasons. However, women with unknown HIV status were significantly more likely to seek care for abortion complications, independent of other potential risk factors. This indicates that women most at risk for abortion complications are not being reached by the existing HIV testing interventions (Wanyenze et al., 2011). There is, therefore, a definite need to evaluate and strengthen the delivery and coverage of existing HIV testing interventions, and the capacity and willingness of pregnant women to access these services. More broadly, research is also needed to determine the linkages between unknown HIV status and abortion complications.

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## Figures



Source: (WHO, 2011a)/(MOH-Uganda)

## Tables

TABLE 1  
Demographic characteristics of the study population by presence or absence of abortion complications

<b>Characteristics</b>	<b>Overall</b>	<b>Abortion Complications N=70 (50.4)</b>	<b>No Abortion Complications N= 69 (49.6)</b>
<b>HIV status</b>			
Positive	18 (12.9)	8 (11.4)	10 (14.5)
Unknown	50 (36.0)	35 (50.0)	15 (21.7)
Negative	71 (51.1)	27 (38.6)	44 (63.8)
<b>Age</b>			
≤ 29 yrs	78 (56.1)	40 (57.1)	38 (55.1)
>29 yrs	61 (43.9)	30 (42.9)	31 (44.9)
<b>Age of Partner</b>			
≤35 yrs	43(30.9)	24 (34.3)	19 (27.5)
>35 yrs	32(23.0)	13 (18.6)	19 (27.5)
Unknown	64(46.1)	33 (47.1)	31 (44.9)
<b>Education</b>			
No Schooling	21 (15.1)	9 (12.9)	12 (17.4)
Primary	53 (38.1)	32 (45.7)	21 (30.4)
Secondary	45 (32.4)	20 (28.6)	25 (36.2)
More than Secondary	20 (14.4)	9 (12.9)	11 (15.9)
<b>Education of Partner</b>			
No Schooling	23 (16.5)	11 (15.7)	12 (17.4)
Primary	45 (32.4)	21 (30.0)	24 (34.8)
Secondary	35 (25.2)	15 (21.4)	20 (29.0)
More than Secondary	21 (15.1)	11 (15.7)	10 (14.5)
Don't Know	15 (10.8)	12 (17.1)	3 (4.3)
<b>Marital Status</b>			
Ever Married	108 (77.7)	47 (67.1)	61 (88.4)
Never Married	31 (22.3)	23 (32.9)	8 (11.6)
<b>Number of Children</b>			
0	20 (14.4)	18 (25.7)	2 (2.9)
1-3	68 (48.9)	32 (45.7)	36 (52.2)
4-8	51 (36.7)	20 (28.6)	31 (44.9)
<b>Number of Pregnancies</b>			
1-2	41 (29.5)	26 (37.1)	15 (21.7)
3- 4	51 (36.7)	20 (28.6)	31 (44.9)
5-10	47 (33.8)	24 (34.3)	23 (33.3)
<b>Health status</b>			
Excellent	28 (20.1)	7 (10.0)	21 (30.4)
Good	83 (59.7)	46 (65.7)	37 (53.6)
Average/Poor	28 (20.1)	17 (24.3)	11 (15.9)
<b>Work status</b>			
Working	42 (30.2)	22 (31.4)	20 (29.0)
Not Working	97 (69.8)	48 (68.6)	49 (71.0)

TABLE 2

Univariate and multivariate logistic regression results showing the relationship between abortion complications, self-reported HIV status, and other characteristics

Characteristics	Crude OR (95% CI)	P-value	Adjusted OR (95%CI)	P-value
<b>HIV status</b>				
Positive	1.3 (0.46, 3.71)	.619	0.76 (0.23, 2.52)	.653
Unknown	3.8 (1.76, 8.23)	< .001	2.80 (1.20, 6.54)	.018
Negative (Ref)	1.00	--	--	--
<b>Age</b>				
≤ 29 yrs	1.1 (0.56, 2.13)	.806	--	--
>29 yrs (Ref)	1.00	--	--	--
<b>Age of Partner</b>				
≤35 yrs	1.19 (0.55, 2.58)	.666	--	--
>35 yrs	0.64 (2.27, 1.52)	.313	--	--
Unknown (Ref)	1.00	--	--	--
<b>Education</b>				
No Schooling	0.92 (0.27, 3.15)	.890	--	--
Primary	1.86 (0.66, 5.26)	.241	--	--
Secondary	0.98 (0.34, 2.82)	.967	--	--
More than Secondary (Ref)	1.00	--	--	--
<b>Education of Partner</b>				
No Schooling	0.23 (0.05, 1.03)	.055	--	--
Primary	0.22 (0.05, 0.88)	.033	--	--
Secondary	0.19 (0.05, 0.78)	.022	--	--
More than Secondary	0.28 (0.06, 1.27)	.098	--	--
Don't Know (Ref)	1.00	--	--	--
<b>Marital Status</b>				
Ever Married (Ref)	1.00	--	--	--
Never Married	3.73 (1.53, 9.09)	.004	--	--
<b>Number of Children</b>				
0	13.95 (2.92, 66.73)	.001	17.49 (3.17, 96.5)	.001
1-3	1.38 (0.66, 2.88)	.394	1.74 (0.78, 3.90)	.177
4-8 (Ref)	1.00	--	--	--
<b>Number of Pregnancies</b>				
1-2 (Ref)	1.00	--	--	--
3-4	0.37 (0.16, 0.87)	.022	--	--
5-10	0.60 (0.26, 1.42)	.245	--	--
<b>Health status</b>				
Excellent (Ref)	1.00	--	--	--
Good	3.73 (1.43, 9.73)	.007	4.86 (1.53, 15.44)	.007
Average/Poor	4.64 (1.48, 14.54)	.009	6.77 (1.67, 27.49)	.007
<b>Work status</b>				
Working	1.12 (0.54, 2.32)	.754	--	--
Not Working (Ref)	1.00	--	--	--

Note. Ref- Reference; OR-Odds Ratio