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The Association between Female Genital Mutilation (FGM) and the Risk of HIV/AIDS in Kenyan Girls and Women (15-49 Years)

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Abstract

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The Association between Female Genital Mutilation (FGM) and the Risk of HIV/AIDS in Kenyan Girls and Women (15-49 Years)

(Under the direction of Dr. Ike S. Okosun, MS, MPH, PhD, FRSPH and Dr. Richard Rothenberg, MD, MPH, FACP).

INTRODUCTION: Kenya like the rest of Sub-Saharan Africa continues to be plagued with high rates of AIDS/HIV. Research has shown that *cultural* practices have serious *implications* for the spread of *HIV/AIDS,* as well as other communicable diseases. One of the practices that have been speculated to have an impact on AIDS/HIV is female genital mutilation (FGM). Despite efforts to eradicate the practice, prevalence of FGM in Kenya remains relatively high. Researchers have postulated that various forms of FGM may be associated with the spread of *HIV/AIDS*.

OBJECTIVE: The purpose of this study is to determine the relationship between FGM and HIV/AIDS using a representative sample of Kenyan girls and women.

METHODS: Data (n=3271) from the Kenya 2003 Demographic and Health Survey was used for this study. Chi-square test was used to examine the distribution of selected risk factors across HIV/AIDS status. Odds ratios from multivariate logistic regression analyses were used to determine association between FGM and *HIV/AIDS*.

RESULTS: This study shows an inverse association (OR=0.508; 95% CI: 0.376-0.687) between FGM and *HIV/AIDS*, after adjusting for confounding variables.

DISCUSSION: The inverse association between FGM and *HIV/AIDS* established in this study suggests a possible protective effect of female circumcision against *HIV/AIDS*. This finding suggests therefore the need to authenticate this inverse association in different populations and also to determine the mechanisms for the observed association.

INDEX WORDS: HIV, AIDS, FGM, KENYA

The Association between Female Genital Mutilation (FGM) and the Risk of HIV/AIDS in Kenyan Girls and Women (15-49 Years)

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CHAPTER 1

INTRODUCTION

1.1 Background

According to the 2009 joint epidemic update report from the United Nations Program on AIDS (UNAIDS) and World Health Organization (WHO), the total number of people living with HIV in 2008 was 33.4 million worldwide. This number is reportedly more than 20% higher than the number in 2000, and the prevalence was roughly threefold higher than in 1990. Out of the 33.4 million worldwide cases, there were 2.7 million people who were newly infected in 2008. There were also 2.0 million AIDS related deaths in the same year. With these staggering numbers, it is evident that AIDS remains a global epidemic (UNAIDS/WHO, 2009).

Sub-Saharan Africa remains the hardest hit region, accounting for 71% of all new HIV infections in 2008. During the same year there were 22.4 million adults and children living with HIV compared to 19.7 million in 2001 (UNAIDS/WHO, 2009). The available evidence suggests that HIV prevalence in Sub-Saharan Africa has stabilized and in some settings may be declining; however data from the 2007 Kenya AIDS Indicator Survey (KAIS) indicates that HIV prevalence in the county has been on the rise. It has increased from 6.7% to 7.4% since 2003 hence reversing the decline reported in previous studies.

In the sub-Saharan region, HIV prevalence among adults aged 15–49 years in urban areas decreased from 10.0% in 2003 to 8.7% in 2007, while HIV prevalence in rural areas increased from 5.6% to 7.0%. Women and girls continue to be affected disproportionately by HIV in sub-Saharan Africa, the number of women infected and affected by HIV and AIDS has continued to increase over the years (UNAIDS/WHO, 2009). For example, the 2003 Kenya Demographic Health Survey shows that HIV prevalence in women aged 15- 49 years was 9% while for men

was under 5 %. It also revealed that HIV prevalence rate among young girls aged between 15-24 was 5.8% compared to 1.2 % for young men in the same age range (KDHS, 2003).

The high levels of vulnerability of women to HIV/AIDS in Kenya are associated with to considerable gaps/inequality in education, income, employment opportunities, health, and access to power and decision-making (Gayanza & Seager, 2005). Differences in the prevalence of HIV rates between men and women in Kenya may also be attributed to deep entrenchment in cultural practices (Tiessen, 2004) which may have serious implications on the spread of HIV/AIDS, as well as other communicable diseases. One of the cultural practices thought to promote HIV transmission is female genital mutilation (FGM). It is believed that various forms of FGM have enhanced, and continue to enhance, the spread of HIV/AIDS among the female population (Kun, 1997 & Brady, 1999).

1.2 Purpose of the Study

The purpose of this study is to establish whether there is an association between FGM and the risk of transmission of HIV/AIDS in Kenyan girls and women (15-49 years). An association between FGM and increased risk of HIV infection, if established, might prove a valuable weapon in the campaign against FGM. Numerous mechanisms whereby FGM may enhance the risk of HIV infection are plausible, but limited data appear in the literature testing this hypothesis. Information obtained from this study may also be used in strategy-formulation to combat the spread of HIV among Kenyans, as well as other communities that continue to practice FGM. Therefore, this study would prove to be significant in those aspects.

1.3 Research Question

The study aims to address the following question:

- Is there an association between FGM and the risk of acquisition of HIV/AIDS in Kenyan girls and women (15-49 years)?

1.4 Hypotheses

From the above research questions, the following hypotheses were formulated:

Ho: There is a decreased risk of HIV transmission among Kenyan girls and women (15-49 years) who have undergone FGM

Ha: There is an increased risk of HIV transmission among Kenyan girls and women (15-49 years) who have undergone FGM

CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Global HIV Epidemiology

The 2009 UNAIDS Epidemic Update reported that the global prevalence rate of HIV/AIDS has continue to rise with an estimated 33.4 million people living with HIV in 2008. Adults accounted for 31.3 million of all cases, women accounted for 15.7 million and the number of children living with HIV was 2.1 million. It is estimated that there were 2 million AIDS-related deaths in 2008. Although the prevalence of HIV/AIDS is on the rise, the incidence of HIV has declined; this can be attributed to the combined effects of continued high rates of new HIV infections and to the beneficial impact of increased availability of antiretroviral therapy (UNAIDS/WHO, 2009).

The epidemic appears to have stabilized in most regions, although increased prevalence due to a high rate of new HIV infections has been noted in Eastern Europe and Central Asia and in other parts of Asia due to a high rate of new HIV infections. Sub-Saharan Africa remains the most affected region, accounting for 71% of all new HIV infections in 2008. The resurgence of the epidemic among men who have sex with men in high-income countries is increasingly well-documented. Differences are apparent in all regions, with some national epidemics continuing to expand even as the overall regional HIV incidence stabilizes. (Relief Web, 2009).

Table 2.1 below summarizes the regional HIV and AIDS statistics from 2001 and 2008.

Table 2.1 Regional HIV and AIDS statistics from 2001 and 2008

	Adults & children living with HIV	Adults and children newly infected with HIV	Adult prevalence (%)	Adult and child deaths due to AIDS
Sub-Saharan Africa				
2008	22.4 million (20.8 –24.1m)	1.9 million (1.6-2.2 m)	5.2 (4.9 -5.4 m)	1.4million (1.1-1.7m)
2001	19.7million (18.3 –21.2m)	2.3million (2.3-2.5m)	5.8 (5.5-6.0)	1.4million (1.2-1.7m)
Middle East & North Africa				
2008	310 000 (250 000–380 000)	35 000 (24 000–46 000)	0.2 (<0.2–0.3)	20 000 (15 000–25 000)
2001	200 000 (150 000–250 000)	30 000 (23 000–40 000)	0.2 (0.1–0.2)	11 000 (7800–14 000)
South & South-East Asia				
2008	3.8 million (3.4 –4.3 m)	280 000 (240 000–320 000)	0.3 (0.2–0.3)	270 000 (220 000–310 000)
2001	4.0 million (3.5–4.5 m)	310 000 (270 000–350 000)	0.3 (<0.3–0.4)	260 000 (210 000–320 000)
East Asia				
2008	850 000 (700 000–1.0 m)	75 000 (58 000–88 000)	<0.1 (<0.1)	59 000 (46 000–71 000)
2001	560 000 (480 000–650 000)	99 000 (75 000–120 000)	<0.1 (<0.1)	22 000 (18 000–27 000)
Oceania				
2008	59 000 (51 000–68 000)	3900 (2900–5100)	0.3 (<0.3–0.4)	2000 (1100–3100)
2001	36 000 (29 000–45 000)	5900 (4800–7300)	0.2 (<0.2–0.3)	<1000 (<500–1200)
Latin America				
2008	2.0 million (1.8 –2.2 m)	170 000 (150 000–200 000)	0.6 (0.5–0.6)	77 000 (66 000–89 000)
2001	1.6 million (1.5 –1.8 m)	150 000 (140 000–170 000)	0.5 (<0.5–0.6)	66 000 [56 000–77 000]

Table 2.1 (continued)

	Adults & children living with HIV	Adults and children newly infected with HIV	Adult prevalence (%)	Adult and child deaths due to AIDS
Caribbean				
2008	240 000 (220 000–260 000)	20 000 (16 000–24 000)	1.0 (0.9–1.1)	12 000 (9300–14 000)
2001	220 000 (200 000–240 000)	21 000 (17 000–24 000)	1.1 (1.0–1.2)	20 000 (17 000–23 000)
Eastern Europe and Central Asia				
2008	1.5 million (1.4 –1.7 m)	110 000 (100 000–130 000)	0.7 (0.6–0.8)	87 000 (72 000–110 000)
2001	900 000 (800 000–1.1 m)	280 000 (240 000–320 000)	0.5 (0.4–0.5)	26 000 (22 000–30 000)
Western and Central Europe				
2008	850 000 (710 000–970 000)	30 000 (23 000–35 000)	0.3 (0.2–0.3)	13 000 (10 000–15 000)
2001	660 000 (580 000–760 000)	40 000 (31 000–47 000)	0.2 (<0.2–0.3)	7900 (6500–9700)
North America				
2008	1.4 million (1.2 –1.6 m)	55 000 (36 000–61 000)	0.6 (0.5–0.7)	25 000 (20 000–31 000)
2001	1.2 million (1.1–1.4 m)	52 000 (42 000–60 000)	0.6 (0.5–0.7)	19 000 (16 000–23 000)
Total				
2008	33.4 million (31.1 –35.8 m)	2.7 million (2.4 –3.0 m)	0.8 (<0.8–0.8)	2.0 million (1.7 m–2.4 m)
2001	29.0 million (27.0–31.0 m)	3.2 million (2.9 –3.6 m)	0.8 (<0.8–0.8)	1.9 million (1.6 –2.2 m)

Note: From "Report on global HIV/AIDS epidemic 2009" UNAIDS/WHO, p 11

2.1.1 Epidemiology of HIV in Sub-Saharan Africa

The Sub-Saharan region in Africa is the area that has been hardest-hit in the continent of Africa. The UNAIDS and WHO AIDS Epidemic Update from 2009 reports that an estimated 1.9 million people were newly infected with HIV in the region in 2008 and that there a total of over 22 million people are living with the virus in Sub-Saharan Africa. This number accounts for 71% of all new HIV/AIDS cases globally in 2008 (UNAIDS/ WHO, 2009).

Rates of the epidemic in Sub-Saharan Africa vary significantly from country to country. The prevalence of HIV/AIDS in a growing number of countries appears to be on the decline (UNAIDS/WHO, 2009). However, it has been noted that in the entire region of Sub-Saharan Africa, females continue to be affected disproportionately compared to males, particularly among the younger population. This difference is accounted for by women's vulnerability which arises from severe economic problems, increased biological and physiological susceptibility to transmission of HIV/AIDS, as well as socio-cultural reasons that they are burdened by (Bradley & Mishra, 2008).

2.1.2 Epidemiology of HIV in Kenya

Unlike the general pattern of decline observed in most other countries in the Sub-Saharan region, there has been an increase in the prevalence of HIV/AIDS in Kenya. The KDHS results from 2003 indicated that 7% of Kenyan adults are infected with HIV compared a previously recorded 6.7%. Majority of HIV cases were acquired through the main mode of HIV transmission, which is through heterosexual sex. A greater percentage of HIV cases are recorded in urban areas (10%) in comparison to 7.5% in the rural areas (KDHS, 2003).

Table 2.2 below depicts the prevalence of HIV positive men and women age 15-59 by selected socioeconomic characteristics:

Table 2.2 Prevalence of HIV+ Men and Women Age 15-59

Socioeconomic characteristic	% HIV positive	%HIV negative	%HIV positive	%HIV negative	%HIV positive	Number
Residence						
Urban	12.3	779	7.5	716	10.0	1495
Rural	7.5	2372	3.6	2135	5.6	4507
Province						
Nairobi	11.9	332	18.6	835	7.9	100
Central	7.6	462	36.3	1181	12.8	244
Coast	6.6	236	20.2	667	15.4	115
Eastern	6.1	514	36.4	1325	13.6	260
Nyanza	18.3	432	35.1	1222	34.8	257
Rift Valley	6.9	747	42.8	1872	30.8	370
Western	5.8	368	4.1	927	2.0	200
North Eastern	0.0	60	98.8	168	98.8	31
Education						
No education	4.4	396	58.2	1039	37.3	388
Primary incomplete	9.3	1052	32.8	2685	18.5	464
Primary complete	10.6	784	31.0	2069	17.4	373
Secondary +	8.2	918	21.0	2403	9.9	351
Employment						
Currently working	9.6	1844	5.9	2007	7.6	3851
Not currently working	7.4	1307	1.5	844	5.1	2151
Wealth Quintile						
Lowest	3.9	505	3.4	431	3.6	937
Second	8.5	580	4.2	501	6.5	1082
Middle	7.1	597	2.2	528	4.8	1125
Fourth	9.7	663	4.3	624	7.1	1287
Highest	12.2	806	7.3	765	9.8	1571
Ethnicity						
Embu	(2.8)	37	(3.7)	37	3.3	73
Kalenjin	4.9	346	2.0	366	3.4	712
Kamba	8.6	392	1.6	334	5.4	726
Kikuyu	6.6	742	2.8	621	4.9	1363

Table 2.2 (Continued)

Socioeconomic characteristic	% HIV positive	%HIV negative	%HIV positive	%HIV negative	%HIV positive	Number
Kisii	7.4	171	0.5	163	4.0	334
Luhya	7.9	481	5.1	438	6.6	919
Luo	25.8	361	17.5	341	21.8	702
Maasai	2.8	76	2.2	56	2.5	132
Meru	6.1	172	1.2	165	3.7	337
Mijikenda/ Swahili	3.8	137	3.0	116	3.5	254
Somali	0.9	100	1.8	77	1.3	177
Taita/ Taveta	11.7	41	7.1	30	9.7	71
Turkana	6.5	39	5.1	45	5.7	84
Kuria	*	19	(5.2)	21	2.7	40
Other	6.7	38	5.6	41	6.1	79
Religion						
Roman Catholic	8.9	800	4.9	756	6.9	1556
Protestant/ other Christian	9.2	2087	4.5	1729	7.0	3816
Muslim	2.7	204	3.1	175	2.9	378
No religion	11.1	52	5.5	185	6.7	237
Total	8.7	3151	4.6	2851	6.7	6001

Figures in parentheses are based on 25-39 unweighted cases. An asteric indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
na = Not applicable

Note: From "Kenya Demographic and Health Survey 2003" 2004, CBS/MOH/ORC, p. 223

In Kenya, just like other Sub-Saharan countries, young girls and women account for a greater proportion of those affected with HIV. Young women between the aged between 15-19 years have a threefold chance of being infected compared to their male counterparts while women between the ages of 20-24 years are 5.5 times more likely to be living with HIV compared to men in their age cohort (UNAIDS/WHO, 2009).

Figure 1 below illustrates HIV/AIDS prevalence by age group and sex in Kenya. It is evident from this chart that there is a great disproportion in the prevalence between males and females. Prevalence is highest among the ages of 25-29 years for both genders.

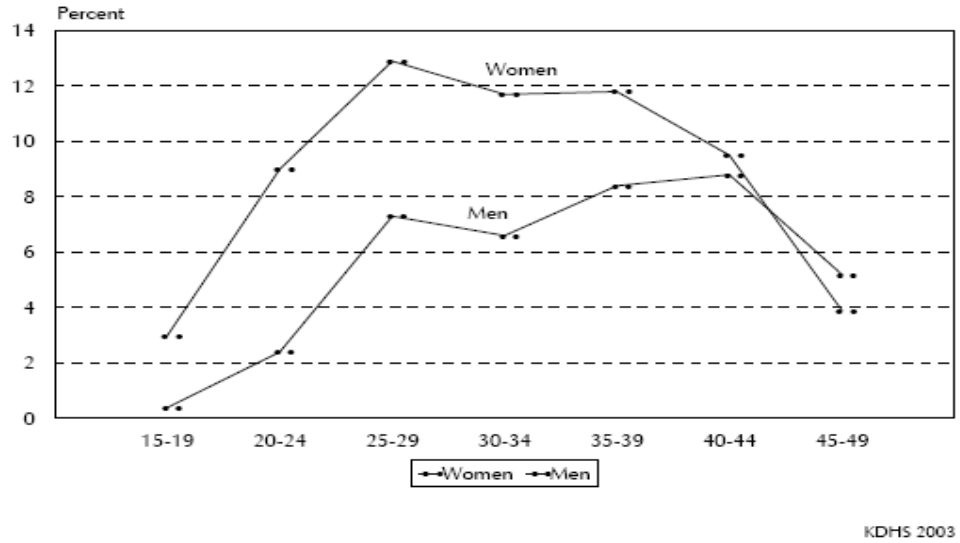


Figure 1 HIV prevalence by Age Group and Sex

Note: From "Kenya Demographic and Health Survey 2003" 2004, CBS/MOH/ORC, p. 222

2.2 Female Genital Mutilation (FGM)

Female genital mutilation (FGM), also known as female genital cutting is described by the World Health Organization as a procedure that totally or partially removes the external female genitalia or causes other injury to the female genital organs for cultural or non-therapeutic reasons. The practice is most prevalent in Africa especially in the northeast and on northern half of the Sub-Saharan region.

The map below (figure 3) obtained from WHO depicts the prevalence of FGM in Africa and Yemen among young girls and women aged 15-49 years. In the African region the highest prevalence of FGM is observed to be in the northeast and northwest countries with rates of 75% and higher.

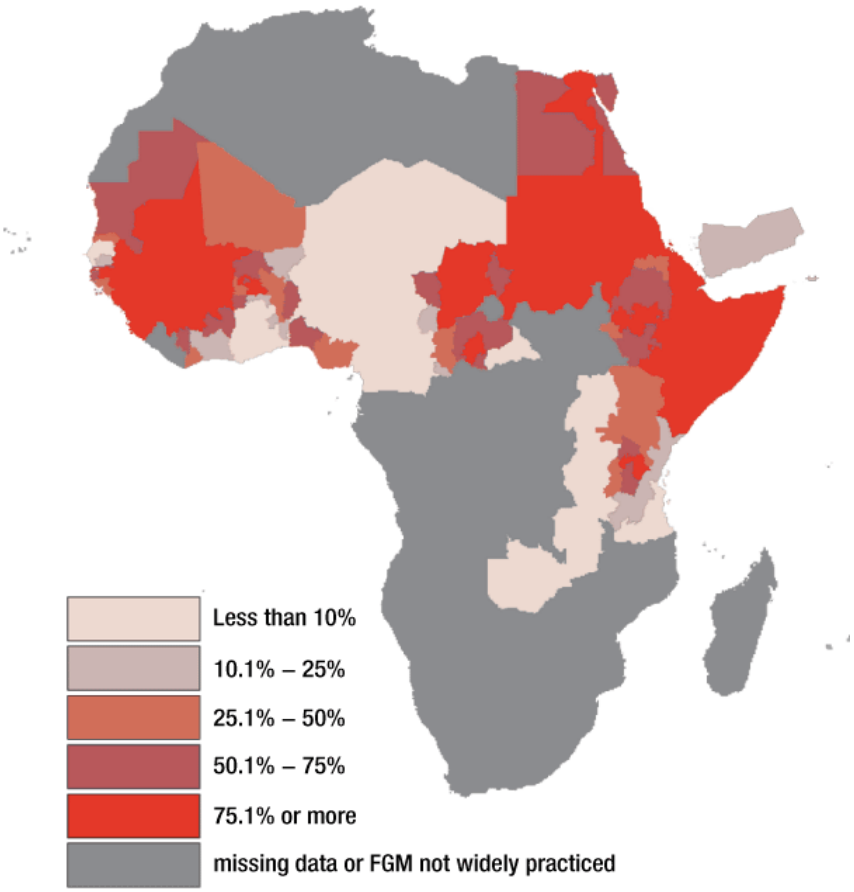


Figure 2 Prevalence of FGM in Africa and Yemen among Young Girls and Women Aged 15-49 Years

Note: From "Female Genital Mutilation" 2010, WHO Website: http://www.who.int/mediacentre/factsheets/fs241/en/

2.2.1 FGM Global Statistics

It is estimated that between 100 and 140 million girls and women worldwide have been subjected to female genital mutilation. Estimates based on the most recent prevalence data indicate that 91.5 million girls and women above 9 years old in Africa are currently living with the consequences of female genital mutilation. There are an estimated 3 million girls in Africa at risk of undergoing female genital mutilation every year (WHO, 2010).

2.2.2 FGM History

The history and origin of FGM remains unclear. “It is believed to have originated in Africa as far back as the fifth century B.C and has taken place in ancient Egypt, ancient Rome, Arabia, and Tsarist Russia” (Little, 2003). The WHO reports that “currently, the practice remains popular in western, eastern, and north-eastern regions of Africa, in some countries in Asia and the Middle East, and among certain immigrant communities in North America and Europe” (WHO, 2010)

2.2.3 FGM Today

In present times the practice continues to mostly be carried out by traditional circumcisers, who often play other central roles in communities, such as attending childbirths. Increasingly, however, FGM is being performed by medically trained personnel (WHO, 2010). According to data from the 1998 KDHS, trained nurses are increasingly performing FGM. During that survey 11% of girls aged 15-19 reported that they were circumcised by a trained nurse under hygienic conditions and 27% of all reported cases of FGM were performed by trained medical staff in hospitals (KDHS, 1998).

The World Health Organization reports that FGM is now “recognized internationally as a violation of the human rights of girls and women. It reflects deep-rooted inequality between the sexes, and constitutes an extreme form of discrimination against women”. The population most affected is children and adolescents. However, in some countries infants under the age of one year comprise a great proportion of the affected population (UNICEF). Nowadays, the practice is viewed by anti-FGM activists as a violation to “a person's rights to health, security and physical

integrity, the right to be free from torture and cruel, inhuman or degrading treatment, and the right to life when the procedure results in death" (WHO, 2010).

2.2.4 Types of FGM

Toubia (1994) describes that there are four different forms of FGM, and the methods used typically depend on the region.

- Type I commonly known as clitoridectomy involves the removal of a part of the clitoris of the whole organ.
- Type II, which is classified as excision involves removal of the clitoris and part of the labia minora.
- Type III also known as intermediate infibulation involves removal of the clitoris and the labia minora plus incision of the labia majora. It also includes the stitching of the anterior two thirds of the labia majora.
- Type IV is unclassified but is sometimes referred to as total infibulation. It involves removal of the clitoris and the labia minora plus incision and stitching of the labia majora to cover the urethra and entrance of the vagina, leaving a very small posterior opening for the passage of urine and menstrual blood.

Figure 3 below illustrates the various forms of FGM in comparison to normal genitalia.

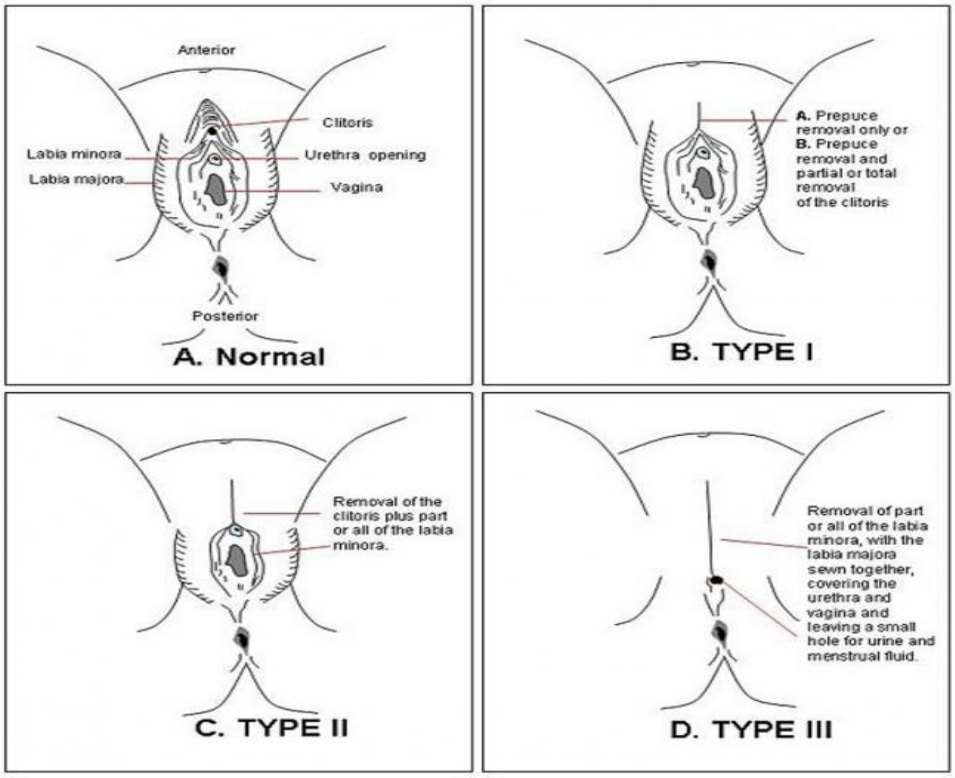


Figure 3 Illustration of the different forms on FGM
Note: From Wikimedia. Website: commons.wikimedia.org/wiki/File:FGC_Types.jpg

2.2.5 FGM Prevalence in Kenya

Kenya is home to more than 40 tribes (CIA World Factbook), and FGM is practiced in more than 75% of the country, although the prevalence of the practice varies widely between the various ethnic groups (GTZ, 2007). The 2003 Kenyan Demographic Health Survey (KDHS) reported that 32% of all Kenyan women aged between 15 and 49 years are circumcised. This is noted to be a decline from the 1998 KDHS when it was recorded at 38%.

Table 2.3 below summarizes the percentage of women circumcised and percentage of eldest daughters age 15 and older who have been circumcised, by background characteristics in Kenya.

Table 2.3 Percentage of women circumcised and percentage of eldest daughters age 15 and older who have been circumcised, by background characteristics.

Background characteristic	% of women circumcised	Number of women	% of eldest daughter circumcised	Number of eldest daughters
Age				
15-19	20.3	1856	*	0
20-24	24.8	1691	*	0
25-29	33.0	1382	*	6
30-34	38.1	1086	12.7	138
35-39	39.7	871	16.9	399
40-44	47.5	788	24.2	591
45-49	47.7	521	22.7	442
Residence				
Urban	21.3	2,056	14.5	281
Rural	35.8	6,139	22.3	1296
Province				
Nairobi	18.6	835	7.9	100
Central	36.3	1181	12.8	244
Coast	20.2	667	15.4	115
Eastern	36.4	1325	13.6	260
Nyanza	35.1	1222	34.8	257
Rift Valley	42.8	1872	30.8	370
Western	4.1	927	2.0	200
North Eastern	98.8	168	98.8	31
Education				
No education	58.2	1039	37.3	388
Primary incomplete	32.8	2685	18.5	464
Primary complete	31.0	2069	17.4	373
Secondary +	21.0	2403	9.9	351
Religion				
Roman Catholic	33.2	2067	22.8	420
Protestant/ other Christian	29.5	5322	17.7	1018
Muslim	49.6	619	44.4	105
No religion	39.6	156	(28.9)	28
Ethnicity				
Embu	43.6	129	*	19
Kalenjin	48.1	831	25.9	156

Table 2.3 (continued)

Background characteristic	% of women circumcised	Number of women	% of eldest daughter circumcised	Number of eldest daughters
Kamba	26.5	938	9.6	187
Kikuyu	34.0	1886	12.8	361
Kisii	95.9	466	95.8	91
Luhya	0.7	1230	1.1	256
Luo	0.7	984	0.9	185
Maasai	93.4	189	(93.8)	48
Meru	42.4	460	11.0	75
Mijikenda/ Swahili	5.8	407	0.7	75
Somali	97.0	298	97.5	47
Taita/ Taveta	62.1	101	*	18
Turkana	12.2	116	(14.6)	25
Kuria	(95.9)	49	*	11
Other	17.6	111	*	33
Wealth Quintile				
Lowest	40.0	1364	26.8	320
Second	40.4	1475	28.8	332
Middle	36.0	1503	20.9	312
Fourth	31.8	1711	13.7	342
Highest	19.1	2141	13.6	271
Total	32.2	8195	21.0	1577

Note: Total includes women with religion "other" or "missing." Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

Note: From "Kenya Demographic and Health Survey 2003" 2004, CBS/MOH/ORC, p. 251

Women in the rural areas represented a greater proportion (35.8%) of women who had undergone FGM compared to 21.3% in the urban areas. North Eastern Province, which was included for the first time in the 2003 KDHS sample, had 98.8% of females circumcised which represented the largest proportion of women who were circumcised. Western Province, which is mainly occupied by the Luhya ethnic group, had 4% of females circumcised; this was the lowest proportion of women who have undergone genital cutting (KDHS, 2003).

The KDHS (2003) also reported that a strong association between FGM status and level of education was observed. Majority of women (58%) with no education reported that they had undergone FGM, compared with only 21% of those with at least some secondary education. A strong relationship between FGM status and religion was also noted. The survey results indicated that one-half of Muslim women (50 percent) are circumcised compared with about one-third of non-Muslim women.

Among the older age groups, a larger proportion of women had been subjected to FGM, rising from 20% of women aged 15-19 to 48% of those aged between 45 and 49. This implied that there had been a radical decline in the prevalence of the practice (by about half) over the last two decades. A higher proportion of rural women (36%) than urban women (21%) had been circumcised. North Eastern province included the largest proportion of circumcised women (99%) (KDHS, 2003).

On average, women now aged between 15 and 19 were subjected to FGM at the age of 13, whereas women between 19 and 49 years were circumcised on average at the age of 15. The age at circumcision varies between the various ethnic groups. For example, the *Taita* circumcise their females as early as in infanthood while. Some ethnic groups circumcise their females as early as infanthood, Female infants are also mutilated (among the *Taita* for instance), while *Somalis, Kisii and Borana* conduct the practice on girls on girls under the age of 10 years. In all districts reports point to the practice being inflicted on even younger girls (GTZ, 2007)

2.2.6 Reasons Supporting the Practice of FGM

Cultural implications play a major role in the practice of FGM. There are many factors that support this custom. One of the major reasons it is still practiced is religion. Muslims who participate in FGM do so in the belief that it is part of their faith and "have pointed to traditions of Mohammed as one source and justification for a form of FGM known as *Sunnah* circumcision" (Broussard, 2008). Religion is a foundation for the beliefs of many; therefore, it is not unusual for one to be firmly rooted in its teachings.

Another justification for the support of FGM is sociological reasons. In many cultures it is the believed to be a rite of passage. Through undergoing female circumcision, a girl is considered to become a woman in many of the cultures that still practice FGM. Therefore, young girls opt to continue this custom in order not to feel left out and different from their peers.

Upholding tradition is important and breaking it is seen as taboo. Some of the cultures that continue to have female circumcision do so because it is a tradition that has been passed on through generations. Also, there are myths to support these traditions. For example, some cultures believe that FGM enhances fertility and promotes child survival (Wuest et al, 2009) and not adhering to these traditions would have adverse effects. Therefore, in order to avoid the negative consequences, it is considered wise to embrace and maintain tradition.

Some groups continue to practice FGM for hygiene and aesthetic reasons: the external female genitalia are considered dirty and unsightly and are removed to promote hygiene and provide aesthetic appeal. Some cultures believe the removal prevents the accumulation of vaginal discharge, vaginal parasites, and also prevents contamination of mother's milk. (Lightfoot-Klein, 1991)

Removal of the clitoris or part of the clitoris by most societies that engage in FGM is a way to insure virginity as well as prevent sexual promiscuity. Virginity is seen as a necessity for a girl to be eligible for marriage. If discovered that a girl has been sexually active prior to marriage it could bring shame and disappointment to the family. Hence, preserving virginity is believed to have many benefits in the communities that continue to engage in female circumcision (Broussard, 2008).

2.2.7 Complications of FGM

FGM is a custom that is shunned by many because of the numerous documented negative health consequences. Serious medical complications do occur due to the nature and conditions by which the procedure is done. Complications following FGM may be immediate or late. The major immediate complications are, hemorrhage, shock and then infection, urinary retention and tetanus, which can lead to death (WHO, 2010).

Some late and long-term complications seen are urinary incontinence, cysts, recurrent urinary tract infections, pelvic inflammatory disease, infertility, and obstetrical problems such as delayed or obstructed second stage labor, and trauma. Hemorrhage is also a late complication especially in newly married girls who have been tightly infibulated and are subjected to forcible sex by the husband or who the husband defibulated using various instruments such as scissors, blades or knives (Brady, 1999).

Pelvic inflammatory disease (PID), a common complication of sexually transmitted disease (STD) is accompanied by abdominal pain, infertility, and ectopic pregnancy. Research indicates that PID is a major problem worldwide and in some African countries. The most prevalent STD’s are gonorrhea and chlamydia. However, it is now believed that FGM plays a

significant role in the development of PID. For the woman who has been infibulated there are added risks of infection and resulting infertility (Brady 1999).

It has been reported that "chronic pelvic disease is three times more prevalent in infibulated women…Chronic retention of urine, menstrual flow, and repeated urinary tract infections with *E. coli* are the consequences of poor drainage, which results from a space formed behind the vulva skin. This then becomes an excellent reservoir for the growth of pathogenic organisms such as the *E. coli"* (Brady, 1999).

A research study from Brady's 1999 paper reported a study in which a high incidence of candiasis (yeast infections) in women who had undergone FGM and urine cultures showed the presence of mixed organisms, specifically *E. coli*. It is suggested the three main causes of PID in the infibulated woman, are: "(1) infection at the time of infibulation, (2) interference with drainage and (3) infection from splitting the infibulation and resulting resuture after labor. The infections then spread to the inner reproductive organs causing infertility" (Brady 1999).

Another long-term effect of FGM is infertility. Brady reports that after female circumcision, sexual intercourse is generally difficult and the process of deinfibulation is painful and can take 2-12 weeks to complete or even up to 2 years during which time the women seek medical help for infertility. It is estimated that a fair percentage of the cases of infertility in communities practicing FGM are due to infibulation, either as a result of chronic pelvic infection or because of difficulty in having sexual intercourse and lack of penetration. In these societies the psychological and social impact of being sterile must be profound because a woman's worth is frequently measured by her fertility, and being sterile can be cause for a divorce (Brady, 1999).

There are many obstetrical complications associated with FGM, for the mother and fetus/baby. Some of the main complications are "delayed second-stage labor, perineal tearing, vesicovaginal fistula, and low birth weight babies…It has been reported that some pregnant women reduce their dietary intake to avoid giving birth to large babies. The obstetrical management for those patients is important and often difficult for those that have not had this type of exposure" (Brady, 1999).

For the above reasons, female circumcision is one of the major public health issues that needs to be addressed. It is therefore evident why the WHO reports that "FGM has no health benefits, and it harms girls and women in many ways. It involves removing and damaging healthy and normal female genital tissue, and interferes with the natural functions of girls' and women's bodies". Thus, efforts continue to be made in order to eradicate female circumcision.

The negative psychological effects could include feelings of terror, anxiety, humiliation, and betrayal that may lead to long-term behavioral characteristics such as docility, feelings of incompleteness and depression. It has also been frowned upon especially when assessed from the "Western" perspective, which is typically viewed as the dominant culture. However, not all effects of FGM are viewed as negative, particularly in places where the practice is part of the ancient culture of the people. In fact, in such societies, women who have not undergone this "essential" rite of initiation may suffer from psychological problems due to fear of rejection by the society and feelings of inferiority. Those women who have undergone FGM experience feelings of empowerment and fulfillment. (Gifford, 1994)

2.2.8. FGM & HIV

It has also been postulated that FGM may directly or indirectly play a role in the transmission of HIV in Kenya. K.E.Kun proposed 4 hypothetical mechanisms by which female circumcision could result in an elevated risk of HIV infection:

i. FGM may result in infection and scarring which causes introital narrowing ranging from complete to partial occlusion of the vagina. Therefore, women are at greater risk of inflammation/ bleeding during intercourse. Consequently, FGM may be contributing to more efficient HIV transmission as disruption to the genital epithelium and exposure to blood during sexual intercourse appear to enhance the risk of infection.

ii. Female circumcision reduces the vaginal opening therefore penetration is difficult and painful, hence increased practice of anal intercourse, which has been shown to enhance the efficiency of HIV transmission

iii. Mutilated women are reported to be at greater risk of hemorrhage in childbirth because of obstructed labor and tearing of perineal scar tissue. This leads to higher risk of blood transfusion with blood supply may not be optimally screened for HIV.

iv. The use of unsterilized instruments in the performance of FGM may also increase the risk of HIV transmission. Knives and blades used may be contaminated with blood since multiple females may be simultaneously mutilated with a single unsterilized instrument.

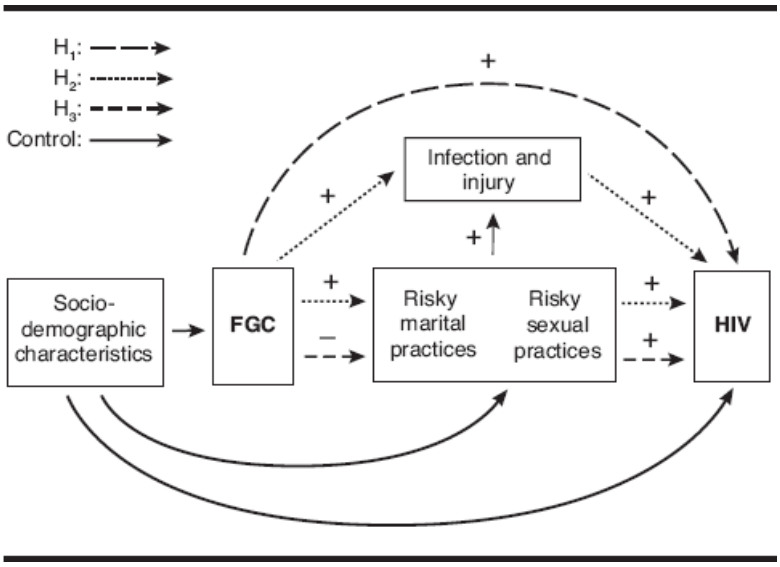
In addition, because FGM raises the social status of the parents, the dowry demands can be high and therefore the young girls can be married off to older men who are already infected (Brady, 1999).

Although little evidence exists, it has also been argued that female circumcision has a protective effect against transmission. Few studies have shown that FGM is associated with a

decreased risk of HIV (Stallings et al, 2005 & Kanki et al, 1992). Yount and Abraham (2007) in their article propose that women who participate in the practice of FGM are more likely to follow the approved set of gender guidelines for the community and are thereby less likely to engage in sex before marriage and extramarital affairs.

The nature of the procedure also has likelihood to increase discomfort for females during sexual intercourse, (Campbell, 2004) therefore severely cut women may be less sexually active due to pain associated with the act. Because FGM has the potential to decrease the frequency of sexual intercourse, it can thereby be postulated that it could lead to a decreased risk of HIV transmission because "coital frequency is positively associated with HIV infection" (Yount & Abraham 2007).

Figure 4 below summarizes the direct and indirect pathways linking FGM with HIV infection.



H1- FGM directly enhances transmission
H2- FGM indirectly enhances transmission
H3-FGM indirectly "protects" against transmission

Figure 4 Illustration showing direct and indirect pathways linking FGM with HIV infection.

From: "Female Genital Cutting and HIV/AIDS among Kenyan Women," 2007, *Studies in Family Planning. 38*, p. 75

2.2.9 FGM International Response

The importance of religion, rite of passage, tradition, hygiene and health, insurance of virginity and chastity, in the cultures that still practice FGM cannot be overlooked. In the minds of the people who adhere to this belief, the benefits gained from this far outweigh any potential danger, (Broussard, 2008) however these individuals lack proper understanding of the issue.

As an international response to this issue, in 1997 the World Health Organization (WHO) issued a joint statement with the United Nations Children's Fund (UNICEF) and the United Nations Population Fund (UNFPA) against the practice of FGM stating:

> "Even though cultural practices may appear senseless or destructive from the standpoint of others, they have meaning and fulfill a function for those who practice them. However, culture is not static; it is in constant flux, adapting and reforming. People will change their behavior when they understand the hazards and indignity of harmful practices and when they realize that it is possible to give up harmful practices without giving up meaningful aspects of their culture".

Since 1997 when the joint statement was issued, there have been great efforts to counteract FGM, through research, work within communities, and changes in public policy. Progress at both international and local levels includes:

- Wider international involvement to stop FGM;
- The development of international monitoring bodies and resolutions that condemn the practice; revised legal frameworks and growing political support to end FGM; and
- In some countries, decreasing practice of FGM, and an increasing number of women and men in practicing communities who declare their support to end it.

- Research shows that, if practicing communities themselves decide to abandon FGM, the practice can be eliminated very rapidly (WHO, 2010)

WHO efforts to eliminate female genital mutilation focus on:

- Advocacy: developing publications and advocacy tools for international, regional and local efforts to end FGM within a generation;
- Research: generating knowledge about the causes and consequences of the practice, how to eliminate it, and how to care for those who have experienced FGM;
- Guidance for health systems: developing training materials and guidelines for health professionals to help them treat and counsel women who have undergone procedures.

WHO is particularly concerned about the increasing trend for medically trained personnel to perform FGM; it strongly urges health professionals not to perform such procedures.

Efforts to ban FGM are proving to be successful in some areas. According to UNICEF, the prevalence of FGM has declined slowly but steadily during the past 15 years. As depicted in figure 5 below, older girls and younger women are less likely to have experienced any form of FGM/C than older women.

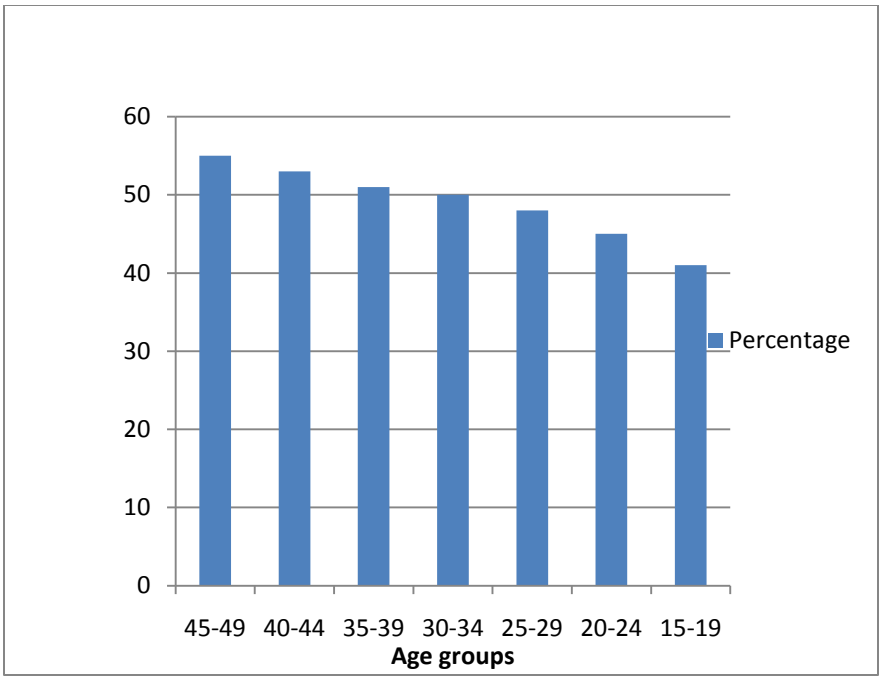


Figure 5 Percentage of FGM among girls and women by age group in 26 countries where these date were available

Note: From "Protecting against Abuse, Exploitation &Violence: Female Genital Mutilation" UNICEF Website: http://www.unicef.org/progressforchildren/2007n6/index_41847.htm

This lowered prevalence of FGM/C may reflect the impact of legislation, policy changes at the national level and actions at the community level (UNICEF).

CHAPTER III

METHODS AND PROCEDURES

3. 1 Source of Data

Data for this study was obtained from the 2003 Kenya Demographic Health Survey (KDHS) which is the latest in a series of national level population and health surveys to be carried out in Kenya in the last three decades. The 2003 KDHS information is intended to assist policymakers and program implementers to monitor and evaluate existing programs and to design new strategies for demographic, social, and health policies in Kenya. The survey collected data on demographic and health issues from a sample of women in the reproductive ages (15-49) and from men age 15-54 years in one-in-two sub-sample of households selected for the male survey (KDHS, 2003). For purposes of this study only data collected from women was used.

3.2 Sample Design & Questionnaire

The 2003 KDHS included Kenya household residents. A representative probability of close to 10,000 households participated in the survey. The selected sample was constructed to provide separate estimates for key indicators for each of Kenya's eight provinces as well as for rural and urban areas separately.

A two-stage sample design was used for the 2003 KDHS. Stage 1 selected sample points from a national master sample which was maintained by the fourth National Sample Survey and Evaluation Program (NASSEP IV). The list included 400 clusters of which 129 were urban and the remaining 271 were rural. Stage 2 selection involved the systematic sampling of households from the 2002 NASSEP IV list. In May and June of 2003 the household listing was updated in

50 selected clusters in the largest cities due to the high rate in structures and household occupancy in urban areas (Measure DHS, 2003).

Only the Women's Questionnaires from the 2003 KDHS was used for this study.

3.3 Variables

The dependent variable used for this study was HIV serostatus (whether HIV positive or negative).

Potential Confounders included:

FGM

- Circumcision status

Demographic characteristics

- Age
- Residence
- Province
- Education
- Religion
- Ethnicity
- Wealth Quintile

Marriage and sexual activity

- Marital Status
- Number of wives of husband/partner
- Age at sexual debut
- Sex partners in last 12 months

- Condom use at last sexual intercourse

Symptoms of infection or sexually transmitted diseases

- Had STD in last 12 months
- Genital sore or ulcer in last 12 months
- Bad smelling abnormal discharge in last 12 months

3.4 Characteristics of Survey Respondents

3.4.1 Gender

Respondents' gender was coded as male or female based on interviewer's observation. Coding choices included "male" or "female". However dataset for this study included females only.

3.4.2 Age

Participants' age in years were obtained from the questions "In what month and year were you born?" and "how old were you at your last birthday?" After comparison of the answers, inconsistencies were corrected. In this study, age was categorized into 15-19, 20-24, 25-29, 30-39, and 40-49 groupings based on previous studies among Kenyan population.

3.4.3 Region of Residence

Region of residence for the participants was coded as either "urban" or "rural".

3.4.4 Province

The respondent's area of residence included the 8 provinces of Kenya which include: Nairobi, Central, Coast, Eastern, Nyanza, Rift Valley, Western and North Eastern.

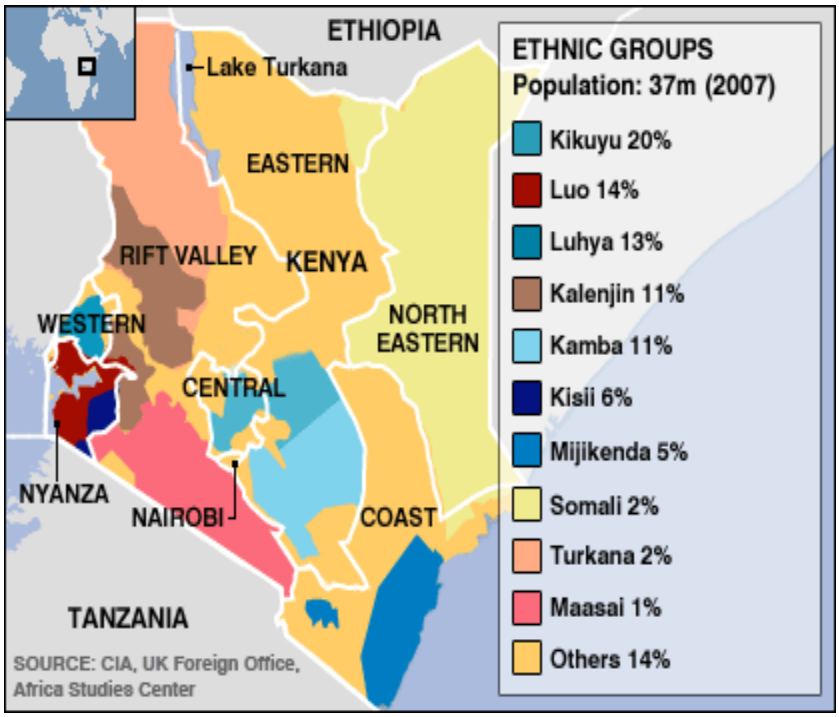


Figure 6 Illustration of the 8 Kenyan provinces and the distribution of ethnic groups within the country

Note: From Google Images. Website: http://bp0.blogger.com/_FJfDH4ti8qg/R6AdQEymuyI/AAAAAAAAAp0/bJ4FoHs4GV8/s1600-h/KenyaEthnicDistribution.gif

3.4.5 Educational Achievement

Education attainment was coded either as “no education”, “primary incomplete”, “primary complete”, “secondary incomplete”, “secondary complete”, “more than secondary”.

3.4.6 Religion

Participants indicated which religion they identified with and responses were recorded as “Roman Catholic”, “Protestant/ other Christian”, “Muslim”, “No religion”, “Other” or “Missing”

3.4.7 Ethnicity

Participants were asked to select which of the 14 major ethnic groups they belong to. Choices included: “Embu”, “Kalenjin”, “Kamba”, “Kikuyu”, “Kisii”, “Luhya”, “Luo”, “Maasai”, “Meru”, Mijikenda/ Swahili”, “Somali”, “Taita/Taveta”, “Turkana”, “Kuria”, and if they did not belong to any of the listed ethnic group there was a choice of “other” which was assigned to participants from ethnic groups that represented small sample sizes.

3.4.8 Wealth Quintile

Wealth quintile was determined from the questions inquiring about employment status, occupation, and earnings. Responses were categorized as “lowest”, “second”, “middle”, “fourth” and “highest”.

3.4.9 Marital Status

Respondents were asked about their marital status using the questions: “Have you ever been married or lived with a woman/man?” and “What is your marital status now: are you widowed, divorced, or separated?” Answers were coded as “never married”, “married”, “living together”, “divorced/separated” or “widowed”.

3.5.9 HIV Status

Participant’s human immunodeficiency virus (HIV) status was determined after participants voluntarily consented to testing. The testing protocol was reviewed and approved by the Kenya Medical Research Institute (KEMRI) and Centers for Disease Control (CDC).

Prior to collecting blood for HIV testing, informed consent was obtained from the participants and the health worker explained the procedure, confidentiality of the data and the fact that test results could not be traced back to or be made available to the subject; the health worker also provided respondents with information on how they could obtain results of the HIV test though VCT services.

Once consent was obtained, blood spots were collected from finger pricks onto filter paper and transported to the CDC laboratory at KEMRI headquarters in Nairobi for testing. Samples were tested with Enzygnost Anti-HIV-1/2 Plus enzyme-linked immunosorbent assay (ELISA) test, and then retesting of all positive and 10 percent of negative tests with a Vironostika HIV-1 MicroELISA system. 29 discrepant samples were then finally tested by the INN-OLIA HIV Western blot kit for confirmation.

3.5 Statistical Analysis

All statistical analyses were performed using SPSS 17.0.

Chi-square test was used to examine the distribution of selected risk factors across HIV/AIDS status and FGM status.

Odds ratios from multivariate logistic regression analysis were used to determine association between FGM and HIV/AIDS.

A *p*-value and 95% confidence interval was used to establish statistical significance.

3.7 Human Subjects Consideration

The Georgia State University Institutional Review Board (IRB) approved exempt status for the study and a protocol number was assigned (H10189). Publicly available data with no subject

identifiers was used. The data used was from the 2003 KDHS and permission to use the data was obtained. Confidentiality of data was maintained at all times.

CHAPTER IV

RESULTS

4.1 Characteristics of the Study Population

After merging the women's data set with the HIV dataset and deletion of respondents who did not consent to HIV testing well as those participants whose HIV serostatus was undetermined, the sample size for this study was 3,271.

As shown in table 4.1, all participants were females between the ages of 15 and 49. Young girls and women between the ages 15-24 years represented almost half (43.3%) of the sample. Over half of the respondents (60.7%) were married/living with a partner, 28.8% had never been married, and the remaining respondents were widowed, separated, or divorced. 30% of the respondents resided in an urban area while 70% resided in a rural area.

The proportion of respondents who had no education was 15.7% while a large majority (53.2%) of the sample had received the primary level of education. 23.4% had completed secondary school however, a small population of only 1.1% had been educated to the university level.

The majority of study participants (87.1%) belonged to a Christian denomination group including Roman Catholics, Protestants and other Christian groups. The remaining were either Muslims (10.9%), belonged to another religion not mentioned above or belonged to no religion.

In terms of ethnic affiliation, *Kikuyu* respondents account for 23% of the study population, and are followed approximately in order of size by the *Luhya, Luo, Kamba*, and *Kalenjin*.

Provinces with the highest number of participants were Rift Valley, Central, Nyanza, and Western with 17.3%, 16.0%, 14.2%, and 13.6%, respectively. The province with the least amount of participants came from North Eastern (4.6%).

Over one fourths of respondents (46.8%) were categorized in the rich and richest categories. 18.3 % were classified as middle class and the remaining 34.9% were either in the poor or poorest categories.

Table 4.1 Demographic and descriptive characteristics of subjects

Characteristics	***n*** (3271)	**Percentage** (%)
Age		
15-19	732	22.4
20-24	684	20.9
25-29	536	16.4
30-34	468	14.3
35-39	356	10.9
40-44	293	8.9
45-49	202	6.2
Marital status		
Never married	941	28.8
Married	1802	55.1
Living together	182	5.6
Widowed	136	4.2
Divorced	45	1.4
Not living together	165	5.0
Residence		
Urban	981	30
Rural	2290	70
Province		
Nairobi	355	10.9
Central	522	16.0
Coast	384	11.7
Eastern	382	11.7
Nyanza	465	14.2
Rift Valley	567	17.3
Western	444	13.6
North Eastern	152	4.6
Education		
No education/preschool/nursery	513	15.7
Primary	1741	53.2
Post-primary/ vocational	45	1.4

Table 4.1 (continued)

Characteristics	***n*** (3271)	**Percentage** (%)
Secondary	765	23.4
College	170	5.2
University	37	1.1
Religion		
Roman Catholic	776	23.7
Protestant/ other Christian	2074	63.4
Muslim	357	10.9
No religion	54	1.7
Other	6	0.2
Ethnicity		
Embu	28	0.9
Kalenjin	287	8.8
Kamba	314	9.6
Kikuyu	752	23.0
Kisii	208	6.4
Luhya	531	16.2
Luo	357	10.9
Maasai	67	2.0
Meru	143	4.4
Mijikenda/ Swahili	220	6.7
Somali	200	6.1
Taita/ Taveta	59	1.8
Turkana	42	1.3
Kuria	22	0.7
Other	41	1.3
Wealth Quintile		
Poorest	557	17
Poorer	585	17.9
Middle	598	18.3
Rich	639	19.5
Richest	89.2	27.3

4.2 The Distribution of Selected Demographic Risk Factors across HIV/AIDS Status

Tables 4.2 shows the results of the chi square test which was conducted in this study to examine the percentage distribution of selected risk factors across HIV/AIDS status. Out of the total number of women used for this study 8.4% were HIV positive.

A comparison of HIV positive and HIV negative participants shows that majority of HIV positive participants in this study are noted to be concentrated among young girls and women

within the age range of 20-34 years. The highest concentration of HIV positive individuals was between the ages of 25-29 (22.9%) compared to 14.5% of HIV negative individuals in the same age category.

Area of residence and region of origin were also statistically significant risk factors for HIV status. HIV positive subjects were 42.2% more likely to reside in an urban area versus 28.9% of HIV negative participants. 29% HIV positive individuals were from Nyanza province versus 12.9% who were HIV negative.

With regard to education, compared with HIV negative women, the HIV positive women were more likely to be educated up to the primary school level (62.6% versus 52.4%). However, HIV positive women were also less likely to have been educated at the university level compared to their HIV negative counterparts (0.7% versus 1.2%).

Religion also played a role; HIV positive women were more frequently non-Roman Catholic Christians (69.5% compared to 62.9%). The ethnic group with the greatest proportion of HIV positive females was the *Luo* (34.2%) and the smallest proportion was among the Kuria (0.0%). HIV positive study subjects were more likely to be categorized into the highest wealth quintile (richest) compared to HIV negative study subjects (38.2% versus 26.3%).

Table 4.2 Percentage distribution of HIV- and HIV+ women (15-49) by selected background characteristics.

Characteristics	HIV- (%)	HIV+ (%)	*p*-value
Age			<0.001
15-19	23.6	9.1	
20-24	20.9	21.1	
25-29	15.8	22.9	
30-34	13.8	19.6	
35-39	10.5	14.5	
40-44	8.9	9.5	
45-49	6.4	3.3	
Residence			<0.0001
Urban	28.9	42.2	
Rural	71.1	57.8	
Province			<0.001
Nairobi	10.5	14.2	
Central	16.1	14.2	
Coast	11.9	9.5	
Eastern	11.9	8.7	
Nyanza	12.9	29.1	
Rift Valley	17.7	13.1	
Western	13.8	11.3	
North Eastern	5.1	0.0	
Education			0.002
No education/ preschool	16.5	7.3	
Primary	52.4	62.6	
Post-primary/ vocational	1.4	1.5	
Secondary	23.4	22.9	
College	5.2	5.1	
University	1.2	0.7	
Religion			0.001
Roman Catholic	23.6	25.8	
Protestant/ other Christian	62.9	69.5	
Muslim	11.6	3.3	
No religion	1.7	1.5	
Other	0.2	0.0	
Ethnicity			<0.001
Embu	0.9	0.4	
Kalenjin	9.1	4.7	
Kamba	9.6	9.8	
Kikuyu	23.4	18.5	
Kisii	6.5	5.1	
Luhya	16.4	14.9	
Luo	8.8	34.2	

Table 4.2 (continued)

Characteristics	HIV- (%)	HIV+ (%)	*p*-value
Maasai	2.1	1.1	
Meru	4.5	2.9	
Mijikenda/ Swahili	7.0	3.3	
Somali	6.6	0.4	
Taita/ Taveta	1.7	2.5	
Turkana	1.3	0.7	
Kuria	0.7	0.0	
Other	1.2	1.5	
Wealth Quintile			<0.001
Poorest	18.0	6.9	
Poorer	18.0	16.4	
Middle	18.6	15.3	
Rich	19.2	23.3	
Richest	26.3	38.2	

An analysis similar to the one above was also conducted however independent variables examined included marital status, sexual activity and FGM status & signs/symptoms of STDs. The results in table 4.3 show that HIV positive individuals were less likely to be married (48.7%) compared to HIV negative individuals (55.7%), more likely to have a co-wife (23.3% versus 16.1%), more likely to be circumcised (74.7% versus 64.8%).

HIV positive females had a greater likelihood (5.5%) of having had genital sores or ulcers in the last year, compared to 1.6% in HIV negative subjects, more likely (5.8%) to have experience genital discharge in the past year compared to 2.5% and more likely to have been diagnosed with an STD (2.5% versus 1.3%).

HIV positive women were less likely to have used a condom during their last sexual encounter (92.2% versus 94.9%) and also more likely to have had more than one sexual partner in the past 12 months.

Table 4.3 Percentage distribution of HIV- and HIV+ women (15-49) by selected potential HIV risk factors (marriage & sexual activity, FGM & infection/symptoms of STD's)

Characteristics	HIV- (%)	HIV+ (%)	*p*-value
Marital status			<0.001
Never married	30.0	15.3	
Married	55.7	48.7	
Living together	5.4	7.3	
Widowed	3.2	14.9	
Divorced	1.3	2.2	
Not living together	4.4	11.6	
Number of co- wives			0.004
None	80.8	74.7	
1 or more	17.5	23.3	
Don't know	1.8	1.9	
Circumcision status			<0.001
No	64.8	77.8	
Yes	35.2	22.2	
Genital sore/ ulcer in last 12 months			<0.001
No	98.2	94.5	
Yes	1.6	5.5	
Don't know	0.2	0.0	
Genital discharge in last 12 months			0.004
No	97.3	94.2	
Yes	2.5	5.8	
Don't know	0.2	0.0	
Condom use during last intercourse			0.094
No	94.9	92.2	
Yes	5.1	7.8	
Had any STD in last 12 months			0.197
No	98.3	96.7	
Yes	1.3	2.5	
Don't know	0.4	0.7	
# of sex partners in last 12 months			0.001
0	30.0	20.4	
1	68.5	75.9	
2	1.4	3.3	
3	1.0	0.4	

4.3 The Distribution of Selected Demographic Risk Factors across FGM Status

Tables 4.4 and 4.5 show the results of the chi square test which was conducted in this study to examine the percentage distribution of selected risk factors across FGM status. Out of the total number of women used for this study 34% of the women reported that they had undergone FGM.

In comparison to women who hadn't undergone FGM, circumcised women were more likely to be categorized as older and between the ages of 30-49, reside in rural areas (78.4% compared to 65.7% in rural areas) and more likely to live in Rift Valley, Nyanza, and Central provinces (23.0%, 17.3%, and 17.1% respectively).

Women who had undergone FGM were more likely to have received no form of education (29.4% versus 8.5% in uncircumcised women) and more likely to be of Muslim religion (19.2% versus 4.3%).

Majority of circumcised women were from the Somali, Kisii, Maasai and Meru ethnic groups, they were also categorized in the poor and poorest grouping categories (23.1% and 22.9% versus 13.9% and 15.7% respectively) compared to uncircumcised females. The rich were less likely to practice circumcision (33.5% versus 15.2%).

Compared to uncircumcised women, females who had undergone FGM were more likely to be married (65.7% versus 49.5%), more likely to have a co-wife (19.7% versus 16.8%). They are also less likely to have reported having a genital ulcer (1.1% versus 2.3%), less likely to have reported having had genital discharge (1.8% versus 3.3%), slightly less likely to have been diagnosed with a STD in the past 12 months (1.3% versus 1.5%), and more likely to be HIV negative (94.5% versus 90.1%). In comparison to uncut women, circumcised females were less likely to have used a condom during their last sexual encounter (97.4% versus 93.0%), and they

are also more likely to have had more than one sex partner in the past 12 months (77.4% versus 64.9%).

Table 4.4 Percentage distribution of FGM- and FGM+ women (15-49) by selected background characteristics.

Characteristics	FGM- (%)	FGM + (%)	*p*-value
Age			<0.001
15-19	26.6	14.3	
20-24	22.9	17.0	
25-29	16.3	16.3	
30-34	12.8	17.2	
35-39	9.5	13.5	
40-44	6.7	13.3	
45-49	5.0	8.4	
Residence			<0.001
Urban	34.3	21.6	
Rural	65.7	78.4	
Province			<0.001
Nairobi	13.7	5.3	
Central	15.4	17.1	
Coast	13.9	7.4	
Eastern	10.5	14.0	
Nyanza	12.6	17.3	
Rift Valley	14.4	23.0	
Western	19.5	2.2	
North Eastern	0.0	13.6	
Education			<0.001
No education/preschool	8.5	29.4	
Primary	54.2	51.2	
Post-primary/ vocational	1.4	1.3	
Secondary	27.4	15.8	
College	6.8	2.2	
University	1.7	0.1	
Religion			<0.001
Roman Catholic	24.0	23.4	
Protestant/ other Christian	67.8	55.2	
Muslim	6.6	19.2	
No religion	1.4	2.2	
Other	0.2	0.1	
Ethnicity			<0.001
Embu	0.8	1.0	
Kalenjin	6.5	13.3	
Kamba	10.3	8.3	
Kikuyu	23.2	22.6	

Table 4.4 (continued)

Characteristics	FGM- (%)	FGM + (%)	*p*-value
Kisii	0.7	17.4	
Luhya	24.5	0.4	
Luo	16.3	0.4	
Maasai	0.2	5.6	
Meru	3.7	5.7	
Mijikenda/ Swahili	9.5	1.3	
Somali	0.0	17.8	
Taita/ Taveta	1.0	3.3	
Turkana	1.8	0.3	
Kuria	0.0	1.9	
Other	1.5	0.8	
Wealth Quintile			<0.001
Poorest	13.9	23.1	
Poorer	15.7	22.2	
Middle	17.5	19.9	
Rich	19.5	19.6	
Richest	33.5	15.2	

Table 4.5 Percentage distribution of FGM- and FGM+ women (15-49) by selected potential HIV risk factors (marriage & sexual activity, FGM & infection/symptoms of STD's)

Characteristics	FGM- (%)	FGM+ (%)	*p*-value
Marital status			0.000
Never married	30.0	15.3	
Married	55.7	48.7	
Living together	5.4	7.3	
Widowed	3.2	14.9	
Divorced	1.3	2.2	
Not living together	4.4	11.6	
Number of co- wives			0.004
None	80.8	74.7	
1 or more	17.5	23.3	
Don't know	1.8	1.9	
Circumcision status			0.000
No	64.8	77.8	
Yes	35.2	22.2	
Genital sore/ ulcer in last 12 months			0.000
No	98.2	94.5	
Yes	1.6	5.5	
Don't know	0.2	0.0	

Table 4.5 (continued)

Characteristics	FGM- (%)	FGM+ (%)	*p*-value
Genital discharge in the last 12 months			0.004
No	97.3	94.2	
Yes	2.5	5.8	
Don't know	0.2	0.0	
Condom use during last intercourse			0.094
No	94.9	92.2	
Yes	5.1	7.8	
Had any STD in last 12 months			0.197
No	98.3	96.7	
Yes	1.3	2.5	
Don't know	0.4	0.7	
# of sex partners in last 12 months			0.001
0	30.0	20.4	
1	68.5	75.9	
2	1.4	3.3	
3	1.0	0.4	

4.3 Multivariate Analysis of HIV Serostatus and Selected Independent Variables

Because the outcome is binary variable, a logistic regression is appropriate. Multivariate logistic regression models of HIV status were constructed to identify the independent effects of the preselected variables. Table 4.6 and 4.7 includes results of simple binary logistic regression with categorical and continuous variables. Ethnicity was eliminated from this analysis due to the small samples within the various ethnic groups.

Table 4.6 Multivariable analysis of the association between selected potential HIV risk factors (marriage & sexual activity, FGM & infection/symptoms of STD's) and HIV serostatus

Variable	Odds Ratio	95% C.I.	*p*-value
Age			
15-19	Reference	Reference	<0.001
20-24	2.813	1.720-4.599	<0.001
25-29	4.645	2.842-7.592	<0.001
30-34	4.445	2.690-7.342	<0.001
35-39	4.604	2.705-7.837	<0.001
40-44	3.474	1.922-6.279	<0.001
45-49	1.715	0.774-3.800	0.184
Residence			
Urban	Reference	Reference	
Rural	0.648	0.423-0.993	0.046
Province			
Nairobi	Reference	Reference	<0.001
Central	0.909	0.524-1.577	0.734
Coast	0.937	0.528-1.662	0.823
Eastern	0.849	0.456-1.579	0.605
Nyanza	2.874	1.761-4.690	<0.001
Rift Valley	0.872	0.503-1.510	0.624
Western	1.101	0.625-1.939	0.740
North Eastern	0.000	0.000	0.996
Education			
No education/preschool/nursery	Reference	Reference	0.003
Primary	1.334	0.786-2.263	0.286
Post-primary/ vocational	1.202	0.373-3.879	0.758
Secondary	0.775	0.433-1.389	0.392
College	0.533	0.244-1.162	0.113
University	0.372	0.80-1.734	0.208
Religion			
Roman Catholic	Reference	Reference	0.331
Protestant/ other Christian	1.009	0.748-1.361	0.952
Muslim	1.458	0.207-1.015	0.054
No religion	1.370	4.57-4.103	0.574
Other	0.000	0.000	0.999
Wealth Quintile			
Poorest	Reference	Reference	0.003
Poorer	1.703	0.963-3.011	0.067
Middle	1.996	1.114-3.577	0.020
Rich	2.952	1.666-5.229	<0.001
Richest	0.015	1.554-5.771	0.001

Table 4.7 Multivariable analysis of the association between selected background characteristics and HIV serostatus

Variable	Odds Ratio	95% C.I.	*p*-value
Marital status	1.601	0.962-2.664	0.070
Number of co- wives	1.000	0.998-1.012	0.960
Circumcision status	0.391	0.262-0.583	<0.001
Genital sore/ulcer in last 12 months	0.826	0.300-2.272	0.711
Genital discharge in last 12 months	1.152	0.430-3.082	0.778
Condom use during last intercourse	1.230	0.425-3.561	0.703
Had any STD in last 12 months	1.168	0.937-1.457	0.167
# of sex partners in last 12 months	1.130	0.374-3.415	0.829

Logistic regression after removal of independent variables that were not significant resulted in a statistically significant model (- 2 X log likelihood = 1.818, $p < 0.001$) accounting for 4.4% of the shared variance (Nagelkerke's method), which included all independent variables specified in the model.

The model classified a total of 91.6% of all observations correctly. Of those who were HIV-, the model correctly classified 100%. Table 4.8 provides the classification results in tabular form.

Table 4.8 Classification table for logarithmic odds model

Observed		Predicted		
		Blood test result		Percentage Correct
		HIV-	HIV+	
Blood test result	HIV-	2991	0	100
	HIV+	274	0	0
Overall percentage				91.6

Age, place of residence, FGM, and the number of sex partners in last year were found to be significant (Table 4.9). The number of sex partners in the last 12 months appears to be the strongest risk factor associated with HIV. Each additional sexual partner increased odds of getting HIV by OR=1.609 (95% CI: 1.223- 2.117). Those who resided in a rural area had reduced risk OR=0.573(95% CI: 0.443 -0.741) compared to those who lived in urban areas. HIV risk was also noted to increase slightly with age OR=1.021 (95%: 1.007-1.036). Finally, circumcision turned out to reduce the risk of HIV and had an OR=0.508 (95% CI: 0.376-0.687).

Table 4.9 Multivariable analysis of the association between selected independent variables and HIV serostatus (Statistically significant variables)

Variable	Odds Ratio	95% C.I	*p*-Value
Age	1.021	1.007-1.036	0.004
Residence	0.573	0.443-0.741	0.000
FGM status	0.508	0.376-0.687	0.000
# of sex partners	1.609	1.223-2.117	0.001

The finding from this study is that FGM decreases the risk of HIV. Yount and Abraham (2007) report that this finding can be attributed to the fact that women who have undergone circumcision are less likely to engage in sexual intercourse, and therefore have fewer sex partners. According to table 4.9, increased numbers of sexual partners increases the odds of getting HIV, therefore fewer sex partners decreases the odds of getting HIV. In order to determine the protective effect of FGM attributed to decreased number of sex partners, the effect of the interaction between FGM and the number of sex partners in this study was tested. Table 4.10 shows the results of the analysis of the interaction and we can conclude that the inverse association between FGM and HIV cannot be explained because the interaction of sex partners and FGM is insignificant (*p*-value = 0.609).

Table 4.10 Effect of the interaction between FGM and number of sex partners in HIV/AIDS

Variable	**Odds Ratio**	**95% C.I**	***p*-Value**
Age	1.021	1.006-1.035	0.004
Residence	0.578	0.447-0.748	<0.001
FGM status	0.768	0.411-1.433	0.407
# of sex partners	1.760	1.760-1.301	<0.001
Interaction of FGM &HIV	0.609	0.310-1.197	0.150

CHAPTER V

DISCUSSION AND CONCLUSION

4.1 Discussion

FGM is a form of violence against women (Krantz & Garcia-Moreno, 2005) and despite many efforts to eradicate this practice, it has remained a global problem and it has recently been labeled a public health issue. In some countries laws have been established to forbid the practice (Rahman & Toubia, 2000), however some societies and cultural groups continue to practice female circumcision secretly (Ndienla, 2008). According to data analyzed for this study, the prevalence of FGM is 34%. Although this is a noted decline, the rate is still relatively high considering all the efforts that have been invested towards banning it.

In addition to the issue of FGM, Kenya also suffers from high rates of HIV with over 7% HIV positive adults (KDHS, 2003). As noted earlier, the general pattern of HIV prevalence in Kenya shows that there has been an increase, unlike in most other countries in the Sub-Saharan region where there has been a decline in HIV prevalence. Like most other countries, women are vulnerable to the risk of HIV transmission and represent majority of infected adults (UNAIDS/WHO, 2009).

It is therefore evident that both of these epidemics greatly affect the female gender and they need attention. Evidence has shown that certain cultural practices play a role in both the rates of HIV and FGM, although more research needs to be done to show causality.

This study investigated whether there is a direct association between FGM and HIV/AIDS. Surprisingly, the results indicated that the practice of FGM turned out to reduce the risk of HIV. While a positive association was hypothesized, a surprising inverse association between cases of

female circumcision and positive HIV serostatus was obtained, hence indicating that FGM may have protective properties against the transmission of HIV. Theories supporting this association propose that women who have undergone circumcision may be deeply rooted in cultural practices of the communities that that belong to. They may therefore have an increased likelihood to follow prescribed gender roles hence decreasing their likelihood to engage in sex before marriage or extramarital affairs (Yount & Abraham, 2007).

Literature reviewed earlier indicated that the nature of the procedure may increase discomfort for females during sexual intercourse, therefore women who are severely cut may not engage in sexual acts as often as those who have not undergone the procedure due to the increased discomfort associated with the act. "In theory, therefore, more severe FGC could reduce the frequency of sexual intercourse, and coital frequency is positively associated with HIV infection" (Yount & Abraham, 2007). However, as discussed earlier, there is a lack of evidence arguing the protective effect that FGM may have against HIV transmission and this is not the first study of this kind to have found this inverse association between FGM and HIV.

There are frequent serious complications associated with FGM especially in rural or traditional settings due to unhygienic practices such as sharing of instruments and use of unsterilized equipment (Kun, 1997). However, as reported by the WHO, the rate of FGM performed by traditional providers is on the decline because it is increasingly being performed by medically trained personnel. More sanitary measures are observed by the trained health professional during the procedure, this therefore potentially eliminates or decreases associated risk factors of HIV transmission.

4.2 Limitations of the Study

The inverse association between FGM and HIV observed in this study should be examined with caution due to limitations of the 2003 KDHS data which may affect the accuracy of the results. Firstly, there was a lot of missing data which had the potential to decrease the statistical power to detect significant effects of the selected variables. It is possible that this may have lead to incorrect interpretation of study results.

Secondly, the data used in this study was self-reported and not measured or observed data except for the HIV results. This data therefore relies on the accuracy of the respondents. Some individuals may not be so apt to respond accurately to questions they deem too personal. The questionnaire used for the study inquires about sexual practices, and not everyone may want to share this kind of information for fear of being judged. This may be especially true in societies where certain topics are discussed openly, such as sex, and discussion of these topics may be viewed as disrespectful or it may even be taboo. Individuals engaging in certain practices such as having multiple sex partners might not reveal this fact. Landman (2008) reports the belief that "women's sexual needs are not as strong as men's and the widespread, socially acceptable practice of polygyny have been associated with underreporting of extramarital sexual activity" by women in Sub-Saharan Africa. A study by Klouman et al (2005), also reported that some tradition-rooted women may consciously under-report their circumcision status when interviewed by people representing modern medicine. Therefore, reliance on self-report for the measurement of both dependent and independent variables raises concern about the validity. Inaccurate information of falsification of responses could severely impact the results of the study.

Third, the issue of self selection bias arises in this study. Respondents participating in this study were asked to voluntarily provide blood specimen for HIV testing. It is possible that an individual who has tested positive for HIV in the past may eliminate themselves from being tested because they already know their status and would rather not share this information with others for fear of stigmatization which is still an issue for HIV positive individuals in Kenya (Yebei, 2008). It is also possible that individuals who considered themselves at low risk for contracting HIV and thought they are HIV negative volunteered to be tested for this study.

Fourth, this study is a cross-sectional study. One significant limitation of a cross-sectional study is that making causal inference could prove to be a challenge. In this study it is difficult to determine whether HIV positive individuals who had undergone female circumcision became positive before or after undergoing FGM. It is therefore possible that there were cases of participants that were HIV positive prior to circumcision, and because it is difficult to establish this fact, they would end up being grouped with the total number of HIV cases associated with FGM and this would lead to incorrect interpretation of results.

Finally, there is also a lack of literature describing a possible biological mechanism for how FGM may reduce the risk of HIV transmission. Therefore, this issue coupled with the above described limitations in this study prohibits generalization of these results.

4.3 Public Significance

Despite the fact that the hypothesized association between FGM and increased risk of HIV infection was not established in this study, results from this study could still prove to be useful in the fight against the practice of FGM. From this study we are able to identify groups that still practice FGM as well as associated FGM risk factors. Using these results we could

therefore formulate cultural specific approaches geared directly towards identified groups still active in the practice of female circumcision. This is important because a general approach because it may not work for everyone and specific approach would most probably yield better results. This study has also contributed to the limited literature which is available in this area of study.

4.4. Recommendations

Direct causality was not established during this study; however a study measuring an indirect association could prove to be useful in the field and is warranted. Further research in this area should be conducted in other countries and settings in order to establish the generalizability of this association. Using clinical versus self-reported data is also recommended in order to eliminate the issue of validity of responses.

4.5 Conclusion

As previously mentioned, research has shown that there is a lowered prevalence of FGM in Kenya, yet increased HIV prevalence. The decline in FGM prevalence may be a reflection of the impact of legislation, policy changes at the national level and actions at the community level. This means that we are on the right path to abandonment of this practice. However, even despite the fact that there is plenty of well documented evidence exploring other negative consequences of circumcision besides HIV transmission, the rates remain relatively high. My recommendation is that more emphasis on education is necessary to combat this issue. The same goes for HIV. During education an important aspect to emphasize is that there are ways cultural practices can be modified in order to avoid harm. For example, some communities have ceased to practice

FGM, yet they still have rite of passage celebrations thus maintaining an important aspect of the tradition.

Success on a large scale for the two issues will require a collective approach. More policies and regulations are necessary for control of the practice of FGM. Concerted action should therefore be taken to abolish female genital mutilation globally and also decrease prevalence of FGM.

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