Why female genital cutting persists

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Abstract

Female Genital Cutting (FGC) remains a pervasive practice in sub-Saharan Africa. Using cross-sectional data from 13 African countries, I contrast health consequences and cultural-economic considerations to explain its continuance. The novelty of this study lies in its representativeness of the population at large and across countries, which allows drawing general lessons about the mechanisms underlying FGC. I demonstrate that ethnic and religious identity foster this intentionally health-destructing practice; being cut increases marriage prospects by almost 40%. While general health impairments or decreased fertility are often used as arguments against FGC, I –in line with medical research– do not find evidence thereof; in fact, cut women have more children on average. Though, unsurprisingly they also have up to 25% increased odds of contracting a sexually transmitted infection. The findings question the health-focused anti-FGC campaigns as FGC-induced health impairments might be conceived as negligible compared to socio-cultural gains by those women concerned.

Keywords: Female Genital Cutting (FGC), Health, Cultural Economics, Custom, Ethnic and Religious Identity.

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1 Introduction

The cruel practice of female genital cutting (FGC) has been brought to the attention of a large international audience by the launch of the book 'Desert flower' in 1998 by the former Somalian super-model Waris Dirie. FGC describes a form of (domestic) violence against the physical integrity of women because part of their genitalia are removed for non-medical but rather socio-cultural reasons. Despite several decades of anti-FGC campaigning by medical specialists and human rights activists the practice continues all over the world, even among migrant communities in Western societies (Dorkenoo *et al.*, 2007 and Berg *et al.*, 2010a). While between 100 and 140 million women have undergone the procedure and three million girls are at risk of being cut every year (WHO, 2010 and UNICEF, 2005), the extent of academic research about causes and consequences of FGC does not reflect the immense number of affected women. This study aims at improving the understanding of the social, cultural, and economic mechanisms underlying the practice so that anti-FGC campaigns can better respond to the realities, (health) needs and perceptions of the women who have undergone FGC. Repeatedly, the existing literature deplores the lack of evidence concerning the channels along which FGC works. FGC is embedded in a complex net of cultural, social, religious, psychological and medical factors that need to be further studied and understood (Berg and Denison, 2013, Berg *et al.*, 2010b and Obermeyer, 2005).

To the best of my knowledge, this is the first large-scale quantitative analysis of FGC that aims at identifying the driving forces for the continuance of this practice by jointly looking at data from 13 African countries. Cultural economic theory suggests that socio-cultural and economic gains of FGC are non-negligible. To this end I test (i) whether practicing communities use FGC as a reputation mechanism and (ii) whether long-term health and fertility impairments resulting from FGC might offset reputation gains. I find that in the communities that practice FGC, it serves as identity marker reinforcing the sense of religious and ethnic belonging. Moreover, marriage prospects are improved for cut women; the odds are almost 40% higher indicating that the reputation mechanism is at work in the marriage market. At the same time, women who have undergone the practice are not more likely to suffer from deviations in the menstrual cycle and tend to have even more children. While on average mothers have 3.81 children, cut women have 4.10 children. In contrast, negative long-term health effects associated with general well-being such as decreased BMI or low levels of hemoglobin could not be found for cut women. The only indication for health issues associated with FGC is a moderate increase in the odds of contracting STIs (25%), vaginal discharge and genital ulcers/sores (15%).

The remainder of the paper is organized as follows: In section 2, the widely accepted understanding of FGC is recapitulated and its prevalence and cultural context are discussed. Section 3 briefly introduces the findings from health-related research and

motivates why a new study of FGC is of use. The theoretical background resting on cultural economic considerations is laid out in section 4. The dataset of 13 African Demographic and Health Surveys (DHS) is presented in section 5 and section 6 introduces the conditional logit model as specification for the binary outcome variables. The results are described in section 7 and section 8 concludes with a discussion of potential paths for interventions.

2 Definition, Prevalence, Context

2.1 Definition

Whether it is called female circumcision, genital mutilation or cutting, all terms refer to the medically unnecessary and painful practice of deliberately damaging the female genitalia. While each culture and local context discusses the practice in its own way, the academic community and the international agencies increasingly use the term female genital cutting, henceforth FGC, as it is considered value-neutral (Yoder *et al.*, 2004).

The accredited definition of FGC is given by the World Health Organization (WHO) as "all procedures that involve partial or total removal of the external female genitalia, or other injury to the female genital organs for non-medical reasons." (WHO, 2010). More specifically, four different types of FGC are distinguished by the WHO according to the severity of the surgical procedure:

1. Clitoridectomy describes the partial or total removal of the clitoris.
2. Excision refers to the partial or total removal of the clitoris and the labia minora.
3. Infibulation is the most severe form of FGC where the vaginal opening is narrowed through the creation of a covering seal.
4. All other harmful procedures to the female genitalia.[1]

The majority of cut women undergoes clitoridectomy or excision. Yet, according to Yoder and Khan (2007), more than 8 million women between 15 and 49 years are infibulated which amounts to 10% of the women who are circumcised. Although the actual occurrence of FGC varies across communities (UNICEF, 2005), these classifications are accepted by the international agencies as subsuming the major tendencies of FGC (WHO *et al.*, 2008).

[1]For more detailed information see the WHO Fact sheet N° 241, February 2010.

2.2 Prevalence

The WHO lists 28 countries in which FGC is practiced (2011). Prevalence is highest in Africa stretching from Mauritania to Ghana and Cameroon, extending across the Central African Republic and finally reaching the East-African coast (Figure 1). According to WHO statistics, Uganda has at 0.8% the lowest prevalence rate among women and girls between 15 and 49. Somalia has the highest, namely 97.9%. Of the 28 countries, 12 have prevalence rates over 50% and of these 5 countries exhibit an incidence of 9 out of 10 among adult women. In total, this amounts to 100-140 million girls and women worldwide who have been subjected to FGC. In Africa alone, an estimated 92 million girls aged 10 and above have been circumcised and each year 3 million girls are at risk of being circumcised (WHO, 2010 and UNICEF, 2005).

Yet, national prevalence rates about FGC are uninformative about who has actually undergone FGC and who is in danger of being cut. Yoder *et al.* (2004) disaggregate country-level data and show that FGC varies by age, region, ethnicity, and religion. Descriptive statistics present evidence that, unsurprisingly, older women are more likely to be circumcised. However, there is no clear trend that FGC "dies out". In 8 out of 12 surveys carried out in Northeastern and Northwestern Africa at least 70% of the circumcised women support the practice. Moreover, circumcised mothers are very likely to have their daughters undergo the same ritual. In 5 of 7 DHS surveys which Yoder *et al.* present, at least 50% of the eldest daughters are circumcised. Religion is often used as an ad-hoc explanation for the occurrence of FGC. Yet, supporters and opponents of FGC can be found within the same religious group, only being separated by geographical distance. Overall Muslims seem to practice FGC more widely than Christians (Johnson, 2000 and Yoder *et al.*, 2004). However, the most important determinants of FGC are regional differences and ethnic identities (Carr, 1997, Gruenbaum, 2001 and UNICEF, 2005).

2.3 Context

FGC is not an uncommon practice in terms of total numbers. The same holds for the cultural and ritual relevance of FGC, it is by no means a marginal event. Often the cutting is an initiation, coming-of-age or gender-identity ceremony which young girls undergo sometime between infancy and the age of 15 (Hernlund, 2003; Gruenbaum, 2001 and Johnson, 2007). For example in the Mandinga communities of Guinea-Bissau, only a cut woman is considered a pure woman (Johnson, 2000). Therefore, in most cases mothers arrange the cutting ceremony of their daughters as it is considered a sign of good parenting. Together with good education and the choice of an adequate husband, FGC is one of the three important components of raising a daughter in Central Guinea (Yoder *et al.*, 1999).

In most communities, the cutting is carried out by traditional circumcisers (WHO, 2010). In recent years, however, the medicalization of FGC has been observed and more and more trained doctors and nurses carry out the cutting (Shell-Duncan, 2001 and Njue and Askew, 2004). Traditional circumcisers and health providers continue cutting girls because they believe that it is an integral part of their culture. Althaus (1997) argues that in communities that practice FGC, cultural and ethnic identity rest heavily upon this tradition. If daughters refuse to undergo FGC, they are not only stigmatized but also ostracized by their peers (Thomas, 2000; Leonard, 2000; Hernlund, 2000 and Ahmadu, 2000). Consequently, young girls long to be cut because they know about the rewards from society and in many cultures can expect a ceremony and presents (UNICEF, 2005). Moreover, being cut is also the path to marriage and associated with marriage is the continuation of the family lineage and honor within the local community. Mackie (1996) draws the link between FGC and the traditional footbinding in China. Both social customs have developed as elitist practices that finally became universal sings of marriageability in the practising communities.

3 Medical Research about FGC

Traditionally, it is the anthropological literature that is concerned with the social and cultural aspects of FGC and analyzes its continuance. Comprehensive reviews are found in the two collections of articles by Shell-Duncan and Hernlund (2000 and 2007). Anthropological research is complemented by medical research about the health consequences of FGC. However, the findings from medical research are inconclusive and/or the studies suffer from major flaws.

Morison *et al.* (2001) study the long-term reproductive health consequences of FGC in The Gambia based on a community survey of women of reproductive age. They find no general health impairments through FGC except a significantly higher risk of contracting bacterial vaginosis and herpes simplex. While their findings are statistically significant, the coefficient estimates are small indicating the lack of economic significance. Moreover, this study cannot control for ethnicity independently of the FGC status and the authors conclude that a clear detrimental effect of FGC on long-term reproductive health cannot be established. Only one recent study claims to find a significantly increased likelihood for obstetric complications among cut women (WHO study group on female genital mutilation and obstetric outcome, 2006). While the study is based on a large sample of 28,393 women, it is hospital based and most of the estimates are not significant at the 5% level for women who have experienced clitoridectomy and show only a moderate relationship between FGC and obstetric complications for women who had an excision. Yet, these two groups make up for the majority of cut women worldwide. The study is contrasted by Browning *et al.* (2010) who looks at 492 Ethiopian obstetric fistulae

patients and concludes that women who had undergone FGC were not more likely to develop these complications from obstructed labor. In similar spirit, Slanger *et al.* (2002) analyzes FGC-induced problems upon first delivery. In a hospital-based study in Nigeria, they find no significant differences in first-delivery for cut versus un-cut women.

Even if long-term (reproductive) health might not be compromised by FGC, sexual sensation is expected to. Berg *et al.* (2010b) conclude in a review of 17 comparative studies about FGC and sexuality that cut women tend to experience pain and reduced sexual satisfaction during intercourse. Yet, Okonofu *et al.* (2002) find, for a sample of 1,836 Nigerian women, that cut women sense sexual orgasms as well and start sexual activity earlier in their life. Okonofu *et al.* further show that cut women have significantly more children casting doubt on the argument that circumcised women are more likely to be infertile. The drawback of the study is that it is again hospital-based and not necessarily representative of the population at large.

A review of anti-FGC interventions by Berg and Denison (2013) lists many small localized studies about determinants, perceptions and the continuance of FGC and compares different anti-FGC strategies. Yet, again the majority of the studies draws on small purposively selected samples or looks at 'FGC cases' exclusively. Health consequences associated with FGC are not systematically analyzed but adverse effects to mental health are suggested as likely. Yet, Berg *et al.* (2010b) clearly state that based on current evidence no conclusions about the psychological consequences of FGC can be drawn.

In a systematic review of FGC-related research between 1997 and 2005, Obermeyer (2005) criticizes that there is no comprehensive, large scale community-based study. She supports the general notion that evidence about the long-term negative health consequences of FGC is inconclusive and many studies are methodologically weak. Medical complications associated with FGC are rare events and therefore difficult to detect in small samples. In addition, hospital-based sampling may introduce sampling bias.

My study aims at directly addressing this critique of the existing literature. I conduct a community-based analysis that makes use of a large sample by pooling the latest DHS surveys for 13 African countries. Thus, the precision of the estimated coefficients and the external validity of the findings will be high. In using the large sample, I also introduce considerable variation in FGC status and I avoid the risk of confounding ethnicity with FGC status.

4 Theoretical Background

Existing rational choice models about FGC are built on the agency cost explanation. Posner (1994) argues that fathers and husbands incur lower supervision costs of their circumcised daughters and wives under the assumption that cut women have a reduced libido. In similar spirit, Mackie (1996) views FGC as a means to ensure paternal certainty

and Chesnokova and Vaithianathan (2010) consider FGC as pre-marital investment that increases and improves marriage opportunities. However, when comparing these models to women's self-declarations about the advantages of FGC, only 11.35% (3.87%) of cut (uncut) women consider virginity as being positively associated with the practice. In turn, roughly 40% of cut women report social acceptance as an advantage of FGC and even among uncut women this category enjoys highest consent (Table 2).

The agency cost models cannot explain the high support rate among women and the continuance of the practice among cosmopolitan migrant communities. This supervision tool should be no longer of need once fathers and husbands arrive in a sexually liberated society. The power of culture is the missing link. In his 1980 seminal paper, Akerlof forcefully demonstrates that the subscription to a social custom and the reputation derived from its obedience can result in the persistence of a norm despite its disadvantage for the individual. In the context of FGC, the cutting is the harmful social custom as the damaging of healthy female genitalia has no health benefits; rather it interferes with the natural functioning of the female body. Yet, the injurious practice persists due to the gain in reputation derived from it; e.g. on top of the 40% of cut women who approve FGC as mechanism to derive social acceptance, 16.22% of cut women in the sample consider FGC a religious requirement (Table 2). Akerlof and Kranton (2000) further nuance the power of culture by introducing identity as part of the utility function and Coyne and Mathers (2010) interpret the standard identity model in the context of FGC.

By integrating reputation and identity in the decision making process, health production necessarily has to enter household utility as a complement because the cutting is a direct intrusion to physical integrity. Thus, assuming common preferences, I can write household utility derived from the consumption of a composite good G, health H and reputation within the community R as follows:

$$U = U_h(G, H, R) = U_h(G, H(N, C_h), R(C_h, C_{-h})) \tag{1}$$

Each household h receives utility not only from resource-based input factors but also from the health of its members, and reputation within the community. The composite health of household h depends on its health seeking behavior and proper nutrition as captured by N as well as its action with respect to circumcision C_h. The reputation a household gains from practicing FGC depends on its own decision C_h and the decisions of all the other households in the community C_{-h}.

As an outcome of a constraint maximization, the demand for health H depends on individual μ_i, household μ_h and community characteristics μ_c as well as household income I and the decision with respect to FGC C_h: $H = H(\mu_i, \mu_h, \mu_c, I, C_h)$. At the same time, the reputation mechanism can work through a better standing within a practicing

community. Prestige is hard to measure empirically. However, in traditional societies, a woman's economic security is ensured by marriage and reputation is derived from affluent and healthy offspring, which will be used as proxies for reputation.

The theoretical considerations lead to two hypotheses that will be empirically tested. The first hypothesis concerns the health impairments induced by FGC.

Hypothesis 1. *The negative health consequences associated with FGC are economically significant and reduce household utility.*

I take different measures of these potentially negative health consequences: overall measures of health such as the Body Mass Index (BMI), weight and the hemoglobin level and indicators of reproductive health such as the incidence of Sexually Transmitted Infections (STIs), genital ulcers and vaginal discharge and fertility as measured by a regular cycle. The hypothesis suggests that the health loss is sizeable and outweighs potential other gains that result from the practice of FGC. Yet, a second competing hypothesis can be derived that stresses the cultural-economic relevance of FGC.

Hypothesis 2. *Socio-cultural and economic gains foster the continuation of FGC.*

Thus, depending on the relative magnitude of the impact of FGC on health versus social outcomes, household engages in the practice or abandon it. As long as the losses to health are bigger than the reputation gains, FGC should gradually die out. However, if this is not the case, we have to understand the socio-cultural environment of FGC better to develop adept policies to protect the physical integrity of women while acknowledging economic necessities.

5 Data

The data to test the above hypotheses come from the consolidation of 13 African Demographic and Health Surveys (DHS). I consider only phases 4 and 5 surveys of countries that report FGC. All countries except one have the surveys conducted between 2003 and 2008-09. As Egypt, Liberia and Tanzania do not report ethnicity, I exclude these countries from the analysis although they have recent DHS surveys. Analyzing FGC based on DHS surveys exhibits the advantage that the surveys are nationally representative and comparable across countries. The sample design is such that representative enumeration areas are chosen from census files and within these areas households are randomly drawn. These enumeration areas are referred to as clusters. This design allows me to control for cluster-fixed effects and to focus on within-cluster comparisons in the empirical analysis as the average number of observations per cluster is 27.91.

The 13 countries in the sample, their shares of the overall sample and the prevalence of FGC in each country are presented in table 1. If the sample were equally split across

the 13 countries, the observations of each country would make up for 7.69%. The actual distribution is spread around this number. The FGC prevalence across countries varies between 3.67% in Cameroon and 96.82% in Guinea. The high prevalence rates do not result from adult women only; 45.42% of the daughters in the sample are circumcised as well (Table 3).

As socio-economic control variables at the level of the individual woman I consider age, education, and marriage status (Table 3). The sample is restricted to women between 15 and 49 years. On average, the women are slightly older than 31 years, however variation is considerable. Their education level is low: While the averaged years of education are slightly less than 2.6, this figure is misleading as all years in school are counted, regardless whether the year is completed or not. The education distribution is highly skewed; roughly half of the sampled women have no education at all.[2] Other important variables of social status in the context of the study are marriage and family decisions: 60.33% of the women are married, they tend to be married before the age of 18 and have on average almost 4 children. In addition, more than two out of three women have lost a child and 19.44% of the women have experienced a pregnancy that did not end in a live birth.

The women's partners are significantly older, namely 42.27 years on average. Their level of schooling is higher although the actual numbers reported are lower. However, male schooling is measured in terms of the highest year of education. Using the same metric for measuring education for women does not alter the results.

Household level information includes household size, wealth, religion and ethnicity. The average household consists of 7.63 members. Following the quintile distribution, almost 40% of the households are classified as poor or very poor. In contrast, 22.55% of the households are categorized as rich. More than half of the households are Muslim. Christians of Catholic, Protestant, Orthodox and Pentecostal denominations account for 33.73% of the sample; the remaining households are Animists, have other religious views or adhere to no religion. Across the 13 countries, I have 165 ethnicities and ethnic groups. Most countries report between 7 and 14 different ethnicities.

The health outcomes I consider are mainly related to reproductive health and are almost universally coded as binary variables. Both cut and uncut women are equally likely to have menstruated in the course of the last six weeks, and they are also equally likely of being amenorrheic. The occurrence of a sexually transmitted infection (STI) in the last 12 months is reported in 10.88% of the cases, vaginal discharge is declared by 15.69% of the women, and 10.81% of the respondents had an ulcer or a genital sore. Cesarean sections are rare events (8.26%). In addition to measures of reproductive health, I also consider the Body Mass Index (BMI) as an general health indicator and the level of hemoglobin in the blood. The women in the sample are on average of normal weight

[2]Replacing this variable by completed years of education does not affect the results.

but have slightly lower hemoglobin levels than would be expected; there are no significant differences between cut and uncut women.

6 Econometric Specification

My main specification is the logistic regression model as most of the response variables y such as the FGC status or the occurrence of an STI are binary variables. Thus, the conditional distribution of the outcome variable follows the binomial distribution with the conditional mean that can be expressed as a conditional probability model:

$$\pi(\,y\,|\,X\,) = \frac{exp(X\beta)}{1 + exp(X\beta)} \tag{2}$$

where the matrix $X = (x_1, x_2, ..., x_K)$ contains the K control variables such as age and the education level. The associated coefficients are collected in the vector $\beta = (\beta_1, \beta_2, ..., \beta_K)'$. Applying the logistic transformation to $\pi(\,y\,|\,X\,)$, I get a model that is linear in its parameters:

$$g(\,y\,|\,X\,) = ln\left(\frac{\pi(\,y\,|\,X\,)}{1 - \pi(\,y\,|\,X\,)}\right) = \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k = X\ \beta \tag{3}$$

I consider only the within-cluster variation and therefore compare each cut woman i to the total number of uncut women (M_i) within the same cluster to limit sources of endogeneity. The total of all cut women is I; the number of uncut women per cluster M_i is allowed to vary across clusters. I further denote the matrix of covariates for each cut woman as $X_{i1} = (x_{i11}, ..., x_{i1K})'$ and the covariate matrix for the j uncut women as $X_{ij} = (x_{ij1}, ..., x_{ijK})'$. Then, the *conditional* likelihood is given by:

$$\mathcal{L}(\beta) = \prod_{i=1}^{I} \frac{exp(\sum_{k=1}^{K} \beta_k x_{i1k})}{\sum_{j=0}^{M_i} exp(\sum_{k=1}^{K} \beta_k x_{ijk})} = \prod_{i=1}^{I} \frac{1}{1 + \sum_{j=1}^{M_i} exp\left(\sum_{k=1}^{K} \beta_k (x_{ijk} - x_{i0k})\right)} \tag{4}$$

Estimating the conditional likelihood model allows me to address cross-cluster heterogeneity by conditioning out the cluster-specific intercepts. In addition, I adjust the standard errors for intragroup correlation to obtain robust variance-covariance estimates.

For the non-binary outcome variables, I employ the standard linear model with cluster-fixed effects and clustered standard errors to obtain robust, within-cluster results (Wooldridge, 2001).

7 Results

Treating circumcision as an exogenous, past event and controlling for observables at the individual level such as age and education, household characteristics such as wealth and cluster-fixed effects, I consider the relationship between FGC and the socio-cultural and long-term health outcomes as causal. Though, this approach is only legitimate if expectations do not influence the decision to practice FGC or if these expectations are persistent and identical across households within the cluster. For the case that expectations introduce endogeneity, I employ robustness tests at the end of the section. In interpreting the results, I take conditional odds ratios. For the case of two binary variables –the outcome and the explanatory variable– the conditional odds ratio is simply the exponential of the estimated coefficient ($OR = exp(\beta_k)$, where $k = 1, 2, ..., K$) given the other explanatory variables are fixed.

7.1 Determinants of FGC

Initially, the determinants of FGC are identified by regressing the variable coding for FGC on a set of covariates. In table 4 column 1, I consider only the relationship between circumcision and the following variables: religion, ethnicity, peer-pressure, age and the number of female siblings as they are considered to be 'truly' exogenous. I find a clear age pattern in that older women are more likely to be cut, however, the effect is moderate. The odds ratio of 1.07 is small indicating that FGC is more than an outdated tradition. A similar result obtains for the number of female siblings. Families with more daughters tend to keep up the FGC tradition more eagerly. Yet again, with an odds ratio of 1.05 the effect is small. While being estimated with high precision, neither age nor family structure are socially important determinants of FGC when considering the size effect. Religious and ethnic identity, in turn, explain compliance with this tradition to a considerable extent. Relative to Christian groups, Muslim communities (excluded category) tend to adhere more to FGC; on average for every one cut, Christian woman more than two Muslim women are affected. Members of traditional religions are neither more nor less likely to carry out FGC. Ethnicity plays an even more important role. The Bissa of Burkina Faso, for example, have an odds of being circumcised that is almost 2000% higher than the odds for the excluded ethnicity Akan (Ghana) who hardly ever practice FGC; the Ethiopian Gurarie group have 39.61 times the odds of being circumcised. In some ethnic groups such as the Ethiopian Oromo or the Ghanaian Soussou, (almost) all women are cut. Thus, ethnic identity in the sense of being born as a member of a particular ethnic group is a key determinant for a household's decision with respect to FGC. This is further supported by the joint significance test of the ethnicity variables (p-value= 0.000). Thus, the socio-cultural environment fosters the continuation of FGC as the practice serves as identity marker –strongly along the ethnic dimension, in a more

moderate fashion concerning religion.

So far, I exclude socio-economic characteristics from the analysis as DHS datasets do not provide wealth information about the family of origin for adult women. However, it is very likely that the family of origin is similar in terms of income and wealth to the family in law as marriage is not a random matching of individuals but happens within the same class (Burdett and Coles, 1997); the same applies for education. A woman's education is a good proxy for the education of other, (older) females in her family of origin (Mak Arvin and Summers, 1999; Davis-Kean, 2005). However, it cannot be argued that a woman's education level influences her FGC status, because the majority of the women are cut during infancy. Including wealth and education in the empirical specification replicates the preceding results (Table 4 column 2). In addition, it shows that within communities FGC is practiced across all economic strata and that higher educational background significantly reduces the likelihood of being circumcised. However, the effect is small in social terms, $OR = 0.94$.

To assess the effect of parental wealth and education more precisely and in a strict causal sense, I also estimate a specification of the probability of daughters being cut, which reinforces the previously gained picture demonstrating that similar mechanisms are in place when FGC is passed on from the mothers to the daughters (Table 4 column 3). Maternal education has a dampening effect on the FGC status of the daughters; paternal education, in contrast, has no effect. In a similar vein, older parents are more likely to have their daughters circumcised, yet again the effect is economically only marginal especially for fathers. If can be deduced that decisions over the cutting of the daughters are rather taken by the mothers. The acquired understanding that Muslim communities are more in favor of FGC is reinforced and again the ethnic component is the most dominant determinant of FGC (p-value of the joint F-test: 0.000). Within communities neither rich nor poor people tend to be stronger advocates of the practice, however households with more daughters are significantly more likely of circumcising them. The female siblings component has gained importance for the cutting of daughters; the odds increase from 5 to 50% relative to their mothers indicating that the determinants of FGC are not fully deterministic and thus, can be addressed and (re-)formed.

7.2 Health consequences of FGC

The Western perspective on FGC has mainly been focused on health as the practice intentionally damages the female genitalia. It has been repeatedly argued by WHO and other anti-FGC activists that FGC has severe long-term health consequences such as for example a reduced BMI, low levels of hemoglobin, genital ulcers, and vaginal discharge (WHO *et al.*, 2008). The health results I derived come from multivariate analysis controlling for individual and household characteristics. The estimates are presented in tables 5 and 6.

First, I consider the most general and most simple measure of health, the BMI (Table 5 column 1). I do not detect any significant differences in the BMI of cut versus uncut women. However, the lack of effect might be spurious because the BMI is a ratio between weight and squared height. If any given woman A is cut as a child and consequently her development is affected, she might remain smaller and more lightweight than her uncut twin B. Calculating the BMIs of each of the two, one might end up with similar BMI values for the unequal twins. Therefore, I also look at height and weight independently. Whether a woman is circumcised or not has no effect on her weight (Table 5 column 2). The results for height are identical. I also examine the hemoglobin level and do not find any indication that cut women are worse off (Table 5 column 3). To assess whether infertility is more likely among women who have undergone FGC, I further study whether cut women are more prone to postpartum amenorrhea. This is not the case (Table 5 column 4). Similarly, cut women report the same history of menstruations as uncut ones (Table 5 column 5).

So far I have not found any indication for hypothesis 1, namely economically significant negative health consequences due to FGC. Finally, I analyze the occurrence of STIs, vaginal discharge and genital ulcers/sores. Table 6 column 1 presents the results for STIs. The odds of having an STI are 24.31% higher for cut women. Moreover, cut women have 1.15 times the odds of a vaginal discharge (Table 6 column 2) and genital ulcers/sores are 1.25 times more likely for women who were subjected to FGC (Table 6 column 3). However, it has to be noted that the last set of genital health impairments might not be *perceived* as major source of concern by the affected women. The data source for this analysis, the Demographic and Health Surveys, is nationally representative for the countries under study. Therefore, many of the women comprising this sample live in rural areas with limited access to proper bath facilities and under challenging hygienic conditions. These women may not necessarily consider itching or pain in the genital area as a major health impairment that needs treatment. Thus, while circumcised women are significantly more prone to genital infections and impairments, deviations in the menstrual cycle do not result. Despite the increased chance of genital problems for cut women, the general long-term health impairments resulting from FGC seem too moderate to cause the practice to be abandoned.

7.3 Social and cultural aspects of FGC

Next, the socio-cultural and economic aspects of FGC are analyzed to determine what cut women can gain relative to their uncut counterparts. Tables 7 and 8 present the results. I consider the reputation effect within the local community working through the marriage market and the number and 'quality' of offspring a women gives birth to. Across specifications, I control for confounding individual and household characteristics

including inter alia schooling and wealth.

In Table 7 column 1, I analyze marriageability. Being circumcised increases the odds of being married by 37.83%. Considering the social and economic context of marriage, it is not surprising that FGC persistently continues in the absence of social security systems for single women. Moreover, circumcised women get married at a considerably lower age compared to their uncut counterparts; circumcision explains roughly 10% of the standard deviation in age at first marriage (Table 7 column 2). In similar spirit, circumcised women tend to be younger when having their first sexual experience. These findings highlight the importance of FGC as signaling device on a traditional marriage market.

Moreover, on top of the findings about similar menstruation patterns between cut and uncut women, column 3 of table 7 presents evidence that circumcised women give birth to more children. Given that circumcision is also interpreted as protection against promiscuity and adultery, the children from circumcised women are very likely to be fathered in an official marriage union. Despite controlling for the marriage status of the women, which has a significant and positive effect on the number of children, FGC increases the overall number of offspring: While uncut women have 3.81 children on average, cut women have 4.10 children. Focusing only on the living children, the earlier results are confirmed with a slight drop in the coefficient size (Table 7 column 4).

As a higher quantity of children does not necessarily imply that the pregnant mothers and the newborns are better off, I also look at pregnancy and delivery complications. Terminated pregnancies that did not result in a live birth are reported by almost one-fifth of the women and circumcised women experience 1.14 times more often a still birth (Table 8 column 1). This finding is mirrored when looking at the number of dead children a women reports as often these lost newborns are also counted as dead children (Table 8 column 2). The notion of the international agencies that babies born to cut women are at higher risk during obstetric labor is supported by the analysis (WHO, 2010 and WHO *et al.*, 2008). Yet, the number of surviving children is nevertheless higher for cut women as already discussed above and therefore the net gain of FGC in terms of the number of children is positive (Table 7 column 4).

Another aspect of giving birth is the likelihood of having a Cesarean section (Table 8 column 3). It does not significantly increase for cut women. But this result is not surprising because only 8.26% of the women who have children ever had a Cesarean section. Consequently, this result rather highlights a supply side issue than representing the (potential) demand for obstetric assistance. In terms of birth weight and thus readiness for survival after birth, children from circumcised mothers are not worse off as compared to their counterparts from uncircumcised mothers (Table 8 column 4).

The results illustrate that the reputation mechanism is at work with respect to marriageability. However, cut women derive disutility from terminated pregnancies, which is offset by the fact that in net terms they have slightly more surviving children than their

uncut counterparts with no discernible differences with respect to chance of survival after birth as measured by birth weight; an indication that socio-cultural gains more than outweigh the health costs.

7.4 Caveats and Robustness of Results

The results are robust across different model specifications and sample sizes. By placing the fixed effects at higher levels such as the region and the country, the sample size is automatically increased moving closer towards national representativeness. At the same time the findings remain robust with respect to the baseline results presented. I also employed a linear probability model which confirms the outcomes. The OLS coefficient estimates correspond roughly to 1/4*logit coefficient estimates (Cameron and Trivedi, 2005).

Despite consistency of results across different model and sample definitions the FGC variable itself has to be considered with caution because it is a self-declared status. One might argue that there is considerable underreporting of FGC due to trauma induced by the procedure and consequent neglect. However, Elmusharaf *et al.* (2006) show that women are well aware of the fact that they are genitally cut and declare it properly. Only when it comes to the extent of FGC, the correctness of the self-reported types according to the WHO classification is low. As this study does not distinguish between the different types of FGC, I can consider the reporting about the 'status' as candid. Further support comes from the Egyptian Fertility Care Society *et al.* (1996) who validate the findings of the DHS survey concerning FGC prevalence rates in Egypt. Yet, similar caution applies for the recall of birth weight and STIs. Recall errors are likely. However, *a priori* they are not systematic, the recall period is short and as these variables are outcome variables the results are not impaired in a linear regression framework, which is tested for.

The exogeneity of the FGC status may also be challenged. It is arguable that omitted variables such as expectations bias the results. Therefore, I employ an instrumental variables model taking either the number of female siblings as instrument or the average FGC prevalence in the community. The number of female siblings affects childhood, teenage and even marriage decisions (Table 7 column 1), however, whether or not a woman had many sisters should not have a direct impact on her adult health outcomes. Similarly, the average FGC prevalence proxies the expectation mechanism and should not directly influence family outcomes. Based on that reasoning, I test the earlier found significant results in a linear IV model. In all cases the instrument identifies the FGC status in the first stage regression with high precision. The results from the structural equations support the previous findings. Yet, the coefficient estimates tend to be larger due to the loss of precision in the two-stage procedure as I only identify the effect of FGC on the different outcome variables for the sub-population of women whose FGC status

depends on the number of their sisters/average prevalence rate. Thus, the IV results back up the previous findings indicating that FGC has an effect on marriageability, fertility decisions, and genital health.

The pooled estimates are appealing for their external validity as they illustrate the average impact of FGC across 13 practicing countries and give a general overview of the socio-cultural and health related consequences of FGC. Yet, for national policies a country-level analysis is required. A graphical representation of the country rank with respect to the impact of FGC on the earlier identified socio-cultural outcomes and genital problems is shown in figure 2. I present the results for six outcome variables, namely (i) marriageability, (ii) age at first marriage, (iii) number of children, (iv) STIs, (v) genital discharge, (vi) ulcers. In all except 2 countries, marriage prospects depend positively on FGC with four countries in which cut women are at least 1.65 times more likely to be married (top left figure). The tendency of cut women to marry early (top right figure) and to have more children (mid-left figure) than uncut women is confirmed for 9 of the 13 countries. When turning to STIs, genital discharge and ulcers (mid-right and bottom figures), I find that across countries the likelihood of having at least one of these genital problems is significantly increased for cut women. Genital discharge is identified across most countries. The country-level analysis highlights two important features of the findings: (i) the pooled results are not driven by a small subset of countries and tend to underrepresent the impact of FGC for 40% of the countries, and (ii) depending on the country-specific channels, along which FGC harms the life of women, adequate national anti-FGC campaigns have to be put in place.

8 Policy Implication and Conclusion

Despite reliable, population-based information about the extent to which FGC is practiced, it does not get much attention by the academic community making evidence-based anti-FGC campaigning a challenge (Berg and Denison, 2013). Traditionally, international agencies and many local NGOs used the painful and injurious short- and long-term health consequences as the main argument against FGC. The analysis at hand shows that it is not an invalid argument but it has to be used with the necessary prudence.

The long-term health costs associated with FGC are low compared to the socio-cultural and reputation gains. Yet, the number of unknown cases who die from the ritual remains an open issue. No accurate figures are available to date on the number of girls who pass away as a consequence of the cutting. At the same time, the importance of FGC as an identity marker should not be underestimated. Even young migrant girls in England and Wales are in danger of experiencing FGC (Dorkenoo *et al.*, 2007). It is estimated that more than 20,000 girls of age 8 or younger are at risk of being circumcised although they live in England and Wales. Similar problems arise in migrant communities in North

America, Australia, New Zealand, and other European countries such as Scandinavia (Berg *et al.*, 2010a). Due to the strong link between FGC and identity, which outlasts even in migrant communities, the practice will not automatically be abandoned with development and modernization. In fact, it has been shown that economic progress often reinforces traditional socio-cultural perceptions.

Therefore, I propose five interventions that (i) help increasing our understanding of FGC and (ii) aim at its abolition. First, I recommend that with a relatively small increase in the overall costs the numerous HIV/AIDS surveys are extended to gain valuable knowledge about a society's reproductive health status in general and FGC in particular. Although the health consequences of FGC and HIV/AIDS are different, both are tightly linked to reproductive health. The suggestion to connect research about HIV/AIDS and FGC is not new. Several contributions allude explicitly to the connection between HIV/AIDS and FGC (Omar and Mohamed, 2006; Mutembei and Mwesiga, 1998 and Njiru, 2004). Mutembei and Mwesiga (1998) argue that repeated use of the same cutting equipment facilitates HIV transmission. However, according to Njiru (2004) traditional elites find justification for FGC in the fight against HIV/AIDS as they argue that FGC reduces promiscuity and consequently the transmission of HIV.

Second, existing evidence is inconclusive about long-term health impairments resulting from FGC. Evidence-based anti-FGC campaigning asks for an abandonment of the rhetoric about FGC-induced, long-term, detrimental health consequences. This rhetoric does not correspond to the daily reality of those women who have undergone the cutting. Even evidence about long-term psychological is scant (Berg *et al.*, 2010b). Rather the aspect of female empowerment under traditional norms has to be reinforced by providing the women with assistance in income-generating activities and knowledge about their right to physical integrity.

Third, large scale sensitization campaigns similar to the HIV/AIDS campaigns are an obvious component of the fight against FGC. Communities at large have to abandon the practice. As the results about marriageability suggest decisions about the cutting of daughters are not taken independently by the individual households but with respect to the community at large. Yet, effective sensitization campaigns have to consider ethnic identities and local values and traditions to offer adequate alternative rituals.

Fourth, HIV/AIDS prevention makes already part of family planning programs. FGC education, in contrast, does not. Traditional family planning programs only include the timing and birth spacing of children, contraceptive use and education about sexuality and STIs. A section about FGC can easily enter the family planning programs that are already put in place in most countries and by building on existing structures the cost-efficiency of the intervention is ensured.

Last but not least, there is an apparent need for rigorous impact evaluations to accompany the interventions. It is broadly known that awareness campaigns do not always

have the desired effect of actually changing individual behavior. FGC can be abandoned as endeavors of the Senegalese nongovernmental organization TOSTAN show. The NGO developed a community education program that improved knowledge, attitude and behavior in dealing with the practice of FGC. The impact study by Diop and Askew (2009) shows that the FGC prevalence among daughters of exposed women decreased significantly over time. Yet, more data and research are needed to analyze and understand the roots and consequences of FGC across countries in detail.

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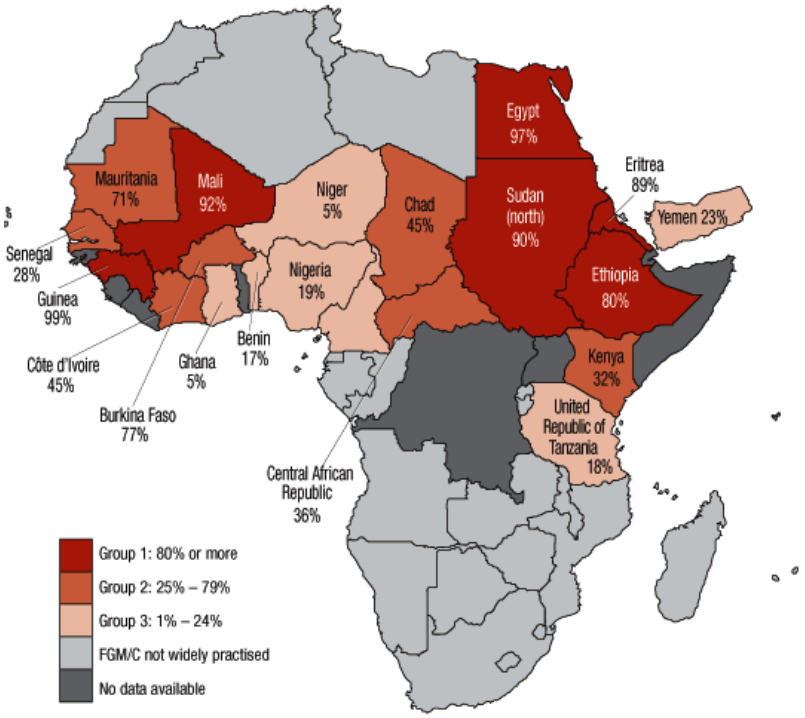

Figure 1: Map of Africa. Highlighted in red are FGC practicing countries. Source: UNDP.

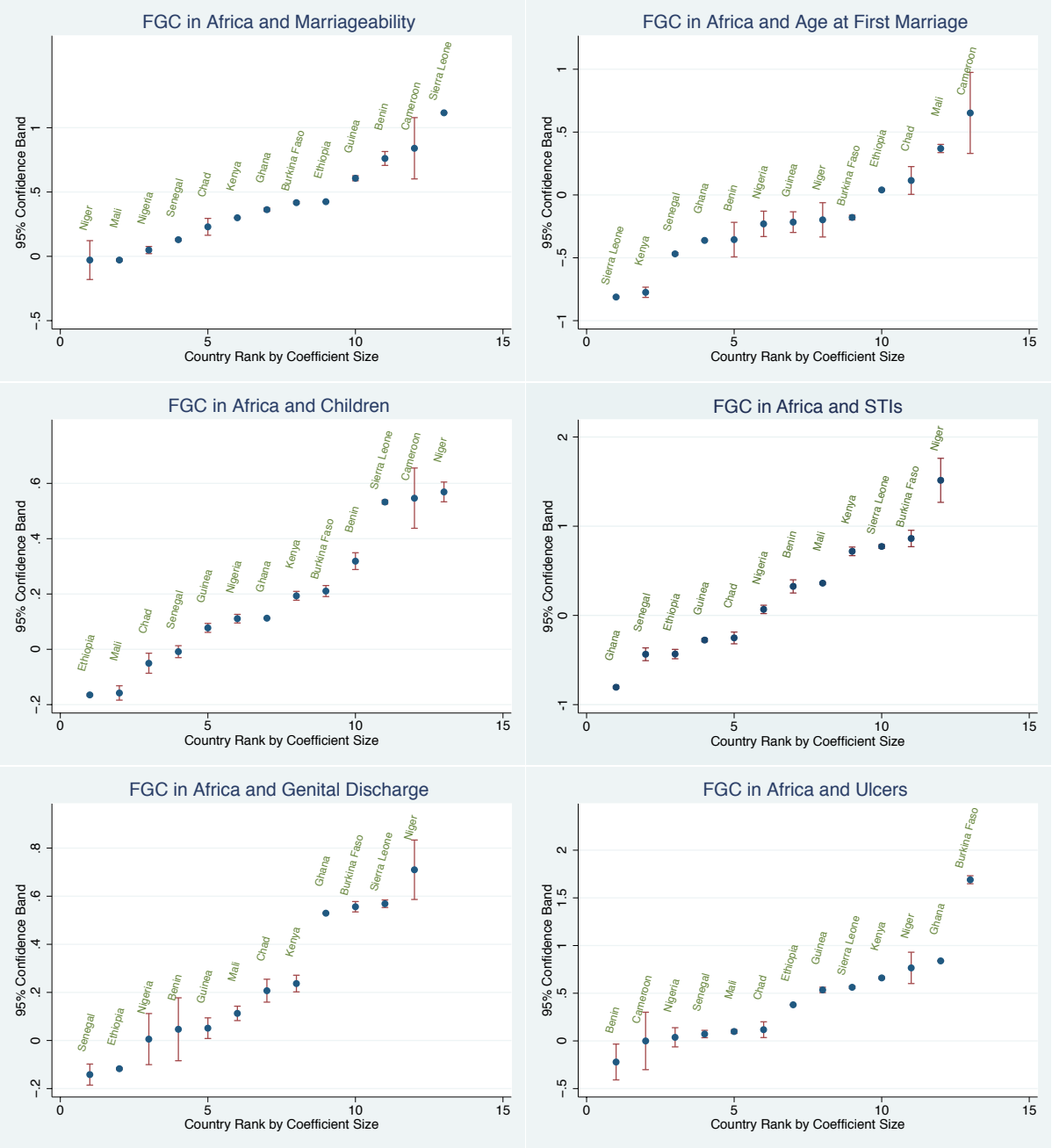

Figure 2: Country-level estimates of the impact of FGC on six socio-cultural and health outcomes: (i) marriageability, (ii) age at first marriage, (iii) number of children, (iv) STIs, (v) genital discharge, (vi) ulcers. The 95% confidence bounds are presented along with the coefficient estimate associated with FGC status. The underlying regressions include country-fixed effects and all relevant control variables as in the pooled regression analysis.

Country name	DHS Code & Phase	Year	Proportion of the overall sample (%)	FGC prevalence (%)
Benin	BJ5	2006	9.22	20.51
Burkina Faso	BF4	2003	9.96	76.91
Cameroon	CM4	2004	0.91	3.67
Chad	TD4	2004	4.47	56.80
Ethiopia	ET4	2005	11.57	71.22
Ghana	GH4	2003	4.49	9.03
Guinea	GN4	1999	6.53	96.82
Kenya	KE5	2008-09	6.58	31.61
Mali	ML5	2006	10.85	88.61
Nigeria	NG5	2008	15.09	45.78
Niger	NI5	2006	3.03	5.50
Senegal	SN4	2005	11.35	38.43
Sierra Leone	SL5	2008	5.96	90.93

Table 1: The countries in the sample, their DHS codes and round numbers, their relative prevalence in the study sample and their FGC prevalence.

	Approval (%)			
	All	Cut women	Uncut women	Difference of means p-value
Cleanliness/Hygiene	9.033	15.250	1.423	0.000
Social acceptance	24.114	39.573	5.227	0.000
Better marriage prospects	6.095	9.640	1.774	0.000
Virginity	7.959	11.348	3.868	0.000
More sexual pleasure for men	2.436	3.726	0.870	0.000
Religious requirment	9.675	16.216	1.676	0.000
Observations	104,026	57,332	45,763	

Table 2: Self-declared advantages of FGC. Not shown is the complementing proportion of women who disagree with the respective statement. No observations available for Ethiopia and Ghana.

Variable	Mean	Std. Dev.	Min	Max
FGC undergone (D)	0.599	0.490	0	1
Circumcised daughters (D)	0.454	0.498	0	1
Married	0.661	0.473	0	1
Living children	3.274	2.280	0	15
Children ever born	3.983	2.811	0	17
Caesarean section (D)	0.083	0.275	0	1
Birth weight	3.183	0.720	0.5	9
Terminated pregnancies (D)	0.194	0.396	0	1
Dead children (D)	0.740	1.204	0	15
BMI	22.531	4.252	12.06	49.90
Weight	57.661	12.027	15.00	185.30
Hemoglobin level	11.836	1.954	0.20	25.20
Amenorrhea (D)	0.260	0.439	0	1
Menstruation (D)	0.530	0.499	0	1
Vaginal discharge (D)	0.157	0.364	0	1
STI (D)	0.109	0.311	0	1
Ulcer (D)	0.108	0.310	0	1
Age	31.161	8.677	15	49
Age at first marriage	17.425	3.982	7	48
Education (years at school)	2.611	4.287	0	23
Pregnancy (D)	0.039	0.194	0	1
Household size	7.626	5.059	1	74
Partner's age	42.239	12.987	15	99
Partner's education (completed years)	1.836	2.500	0	11
Female siblings	2.525	1.803	0	13
Religion (major groups)				
Muslim	0.607	0.488	0	1
Animist	0.014	0.116	0	1
Catholic	0.122	0.327	0	1
Protestant	0.166	0.372	0	1
Orthodox	0.044	0.205	0	1
Pentecostal	0.005	0.072	0	1
No religion	0.018	0.133	0	1
Wealth Index				
Category I	0.198	0.399	0	1
Category II	0.189	0.392	0	1
Category III	0.198	0.398	0	1
Category IV	0.189	0.392	0	1
Category V	0.225	0.418	0	1

Table 3: Summary statistics. For the control variables that are included in the different specifications the summary statistics are based on the largest sample employed. D indicates that the variable is a dummy variable

	FGC undergone	FGC with further correlates	Circumcised daughters
Age$^{\diamond}$	0.059***	0.055***	0.116***
	(0.002)	(0.002)	(0.003)
Female siblings	0.044***	0.047***	0.406***
	(0.007)	(0.007)	(0.015)
Education$^{\diamond}$		-0.062***	-0.042***
		(0.004)	(0.007)
Household size			0.002
			(0.004)
Father's age			0.006***
			(0.002)
Education of the father			0.003
			(0.009)
Religion			
Animist	-0.372***	-0.330***	-0.158
	(0.118)	(0.117)	(0.167)
Catholic	-0.837***	-0.750***	-0.629***
	(0.060)	(0.060)	(0.077)
Protestant	-0.884***	-0.798***	-0.882***
	(0.064)	(0.064)	(0.096)
Orthodox	-0.466***	-0.446***	-0.569***
	(0.100)	(0.100)	(0.164)
Pentecostal	-0.583	-0.614	-15.699***
	(0.404)	(0.402)	(1.075)
No religion	-0.402***	-0.394***	-0.312*
	(0.111)	(0.111)	(0.154)
Wealth Index			
Category I		0.012	0.075
		(0.072)	(0.088)
Category II		0.096	0.059
		(0.066)	(0.085)
Category III		0.077	0.046
		(0.059)	(0.081)
Category IV		0.055	0.095
		(0.050)	(0.072)
Observations	75,601	75,540	38,945
Clusters	2,804	2,804	2,669
Countries	12	12	12
Regression type	CL	CL	CL

Table 4: Determinants of FGC. Conditional logit (CL) regressions are employed with fixed effects being set at the cluster/neighborhood level. Clustered standard errors are in parentheses. Binary variables coding for ethnicity are included. In columns (2) and (3) four wealth categories are included. The coefficients associated with wealth and ethnicity are not presented for the sake of brevity. $^{\diamond}$In column (3) the age and education variables represent maternal variables. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

	BMI	Weight	Hemoglobin	Amenorrhea	Menstruation
FGC undergone	-0.055	-0.059	-0.009	-0.021	0.039
	(0.058)	(0.162)	(0.048)	(0.036)	(0.030)
Age	0.066***	0.198***	0.002	-0.052***	0.012***
	(0.003)	(0.008)	(0.002)	(0.001)	(0.001)
Education	0.083***	0.317***	0.006	-0.024***	0.028***
	(0.007)	(0.019)	(0.004)	(0.004)	(0.003)
Pregnancy	0.793***	2.309***	-1.132***	-2.455***	-2.402***
	(0.065)	(0.183)	(0.038)	(0.103)	(0.068)
Married	0.550***	1.773***	0.066	0.390***	-0.258***
	(0.074)	(0.199)	(0.048)	(0.048)	(0.040)
Household size	-0.011***	-0.012	-0.007**	0.050***	-0.013***
	(0.004)	(0.012)	(0.003)	(0.003)	(0.002)
Partner's age	0.007***	0.022***	0.000	-0.004***	0.004***
	(0.002)	(0.004)	(0.001)	(0.001)	(0.001)
Partner's education	0.044***	0.125***	0.005	-0.004	0.009**
	(0.009)	(0.026)	(0.007)	(0.005)	(0.004)
Wealth Index					
Category I	-1.484***	-4.490***	-0.295***	0.560***	-0.385***
	(0.090)	(0.261)	(0.069)	(0.051)	(0.044)
Category II	-1.453***	-4.432***	-0.256***	0.494***	-0.340***
	(0.089)	(0.253)	(0.065)	(0.049)	(0.040)
Category III	-1.179***	-3.638***	-0.178***	0.406***	-0.266***
	(0.086)	(0.244)	(0.061)	(0.046)	(0.038)
Category IV	-0.830***	-2.581***	-0.138***	0.250***	-0.135***
	(0.077)	(0.218)	(0.052)	(0.040)	(0.032)
Observations	63,659	63,924	25,391	78,127	82,216
Clusters	5,581	5,582	4,007	4,663	5,152
Countries	13	13	10	13	13
Regression type	FE	FE	FE	CL	CL

Table 5: The link between FGC and measures of the general health status/ a woman's cycle. Linear fixed effects (FE) and conditional logit (CL) regressions are employed with fixed effects being set at the cluster/neighborhood level. Clustered standard errors are in parentheses. Binary variables coding for ethnicity and religious affiliation are included, coefficients are not presented for the sake of brevity. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

	STI	Vaginal discharge	Ulcer/ Genital sore
FGC undergone	0.218*	0.143**	0.226**
	(0.114)	(0.067)	(0.099)
Age	-0.004	-0.009***	-0.014***
	(0.003)	(0.002)	(0.003)
Education	0.020***	0.0*1	-0.009
	(0.007)	(0.005)	(0.008)
Pregnancy	0.071	0.213***	-0.007
	(0.107)	(0.068)	(0.105)
Married	0.039	-0.151**	-0.016
	(0.100)	(0.066)	(0.092)
Household size	0.004	-0.003	0.003
	(0.006)	(0.004)	(0.005)
Partner's age	-0.002	-0.003*	0.001
	(0.002)	(0.002)	(0.002)
Partner's education	0.025**	0.014*	0.026**
	(0.011)	(0.008)	(0.011)
Wealth Index			
Category I	-0.178	-0.058	0.123
	(0.127)	(0.088)	(0.115)
Category II	-0.01	0.006	0.243**
	(0.118)	(0.085)	(0.107)
Category III	-0.024	-0.042	0.153
	(0.111)	(0.079)	(0.100)
Category IV	-0.092	-0.034	0.188**
	(0.093)	(0.066)	(0.087)
Observations	25,559	43,679	29,737
Clusters	1,300	2,328	1,480
Countries	11	13	11
Regression type	CL	CL	CL

Table 6: The link between FGC and genital problems. Conditional logit (CL) regressions are employed with fixed effects being set at the cluster/neighborhood level. Clustered standard errors are in parentheses. Binary variables coding for ethnicity and religious affiliation are included, coefficients are not presented for the sake of brevity. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

	Married	Age at first marriage	Children ever born	Living children
FGC undergone	0.321***	-0.360***	0.154***	0.145***
	(0.030)	(0.048)	(0.026)	(0.023)
Female siblings	0.018***	0.010		
	(0.005)	(0.007)		
Age	0.114***	0.058***	0.224***	0.170***
	(0.002)	(0.002)	(0.001)	(0.001)
Education	-0.084***	0.245***	-0.083***	-0.063***
	(0.003)	(0.005)	(0.002)	(0.002)
Pregnancy			-0.143***	-0.191***
			(0.030)	(0.025)
Married			0.324***	0.376***
			(0.029)	(0.025)
Partner's age			0.004***	0.003***
			(0.001)	(0.001)
Partner's education			-0.006	0.006*
			(0.004)	(0.003)
Wealth Index				
Category I	-0.591***	-0.227***	0.338***	0.134***
	(0.047)	(0.066)	(0.039)	(0.035)
Category II	-0.483***	-0.263***	0.300***	0.097***
	(0.044)	(0.063)	(0.036)	(0.032)
Category III	-0.355***	-0.272***	0.233***	0.077***
	(0.039)	(0.059)	(0.034)	(0.030)
Category IV	-0.252***	-0.288***	0.185***	0.084***
	(0.032)	(0.053)	(0.028)	(0.025)
Observations	115,620	95,668	83,504	82,529
Clusters	4,778	5,665	5,637	5,287
Countries	12	13	13	12
Regression type	CL	FE	FE	FE

Table 7: The link between FGC and marriage/family prospects. Linear fixed effects (FE) and conditional logit (CL) regressions are employed with fixed effects being set at the cluster/neighborhood level. Clustered standard errors are in parentheses. Binary variables coding for ethnicity and religious affiliation are included, coefficients are not presented for the sake of brevity. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.

	Terminated pregnancies	Dead children	Caesarean section	Birth weight
FGC undergone	0.128***	0.075***	-0.042	0.021
	(0.044)	(0.022)	(0.099)	(0.020)
Age	0.047***	0.071***	-0.034***	0.004***
	(0.002)	(0.001)	(0.005)	(0.001)
Education	0.006	-0.052***	0.064***	0.000
	(0.004)	(0.003)	(0.008)	(0.002)
Pregnancy		0.095***	-0.325*	0.028
		(0.028)	(0.188)	(0.030)
Married	0.086	0.129***	0.389***	-0.020
	(0.056)	(0.030)	(0.127)	(0.025)
Household size	-0.011***	-0.005***	0.009	-0.002
	(0.003)	(0.001)	(0.008)	(0.001)
Partner's age	0.001	0.002***	-0.006	0.001
	(0.001)	(0.001)	(0.004)	(0.001)
Partner's education	0.013***	-0.012***	0.014**	0.001***
	(0.006)	(0.003)	(0.014)	(0.003)
Wealth Index				
Category I	-0.227***	0.262***	-0.788***	-0.017
	(0.061)	(0.031)	(0.192)	(0.033)
Category II	-0.207***	0.275***	-0.564***	-0.003
	(0.056)	(0.031)	(0.157)	(0.028)
Category III	-0.155***	0.235***	-0.665***	-0.002
	(0.052)	(0.029)	(0.145)	(0.023)
Category IV	-0.132***	0.183***	-0.255**	0.045**
	(0.044)	(0.026)	(0.103)	(0.018)
Observations	65,137	80,579	18,285	20,487
Clusters	4,226	5,016	1,111	4,119
Countries	13	13	12	13
Regression type	CL	FE POIS	CL	FE

Table 8: The link between FGC and fertility/birth outcomes. Conditional poisson (FE POIS), conditional logit (CL) and linear fixed effects (FE) regressions are employed with fixed effects being set at the cluster/neighborhood level. Clustered standard errors are in parentheses. Binary variables coding for ethnicity and religious affiliation are included, coefficients are not presented for the sake of brevity. ***, **, * indicate significance at the 1, 5 and 10% level, respectively.