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Economic status, a salient motivator for medicalisation of FGM in sub-Saharan Africa: Myth or reality from 13 national demographic health surveys

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ABSTRACT

Female Genital Mutilation or Cutting (FGM) and its medicalisation remain a challenge in sub-Sahara African (SSA). Early identification of at-risk women might help in instituting focused counselling against FGM medicalisation. We hypothesised that the risk of medicalised FGM by girls/women is associated with socioeconomic status (SES) their household belongs.

We used 2010–2019 Demographic and Health surveys data from 13 countries in SSA. We analysed information on 214,707 women (Level 1) nested within 7299 neighbourhoods (Level 2) from the 13 countries (Level 3). We fitted 5 multivariable binomial multilevel logistic regression models using the MLWin 3.03 module in Stata. The estimation algorithms adopted was the first order marginal quasi-likelihood linearisation using the iterative generalised least squares.

The odds of FGM medicalisation increased with the wealth status of the household of the woman, with 29%, 45%- and 75%-times higher odds in the middle, richer and richest household wealth quintiles, respectively than those from the poorest households ($p < 0.05$). The more educated a woman and the better a woman's community SES was, the higher her odds of reporting medicalisation of FGM. Rural community was associated with higher odds of medicalised FGM than urban settings.

Medicalised FGM is common among women from a high socioeconomic, educational background and rural settings of SSA. We recommend a culturally sensitive policy that will discourage perpetuation of FGM, particularly by healthcare providers. Future studies should focus on identifying drivers of FGM among the high social class families in the society in SSA.

Introduction

Female genital mutilation or cutting (FGM) was initially regarded as a public health challenge of low-middle income countries, driven largely by socio-cultural and religious beliefs (McCauley & van den Broek, 2019; Nabaneh & Muula, 2019; Odukogbe, Afolabi, Bello, & Adeyanju, 2017). However, FGM practice has spread to high-income countries over the years due to increasing migration of the population of people that believe, promote and practice FGM (Karlsen, Mogilnicka, Carver, & Pantazis, 2019) (Creighton, Samuel, Otoo-Oyortey, & Hodes, 2019). According to the World Health Organisation (WHO), FGM are procedures that involve partial or total removal of any part of the external female genital organ for non-medical reasons. FGM practice is classified into four different types based on the extent of anatomic disruption of external genital organs of girls and women (Odukogbe et al., 2017). The structural damage to the female genital organ could be in form of an excision, piercing, scraping, pricking, incising or cauterisation of skin (Odukogbe et al., 2017).

FGM is most common in Africa, Middle East, and some part of Asia, as part of socio-cultural practice or rite of passage to maturity for girls

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and women (Cappa, Van Baelen, & Leye, 2019; Odukogbe et al., 2017; Yoder, Wang, & Johansen, 2013). It is estimated that 200 million girls and women are living with FGM in over 30 countries (Utz-Billing & Kentenich, 2008; Yoder et al., 2013). Each year, an additional 3.6 million girls/women are at risk of FGM if there is no intervention to stop it (Cappa et al., 2019; Utz-Billing & Kentenich, 2008). In Africa, about 90 million girls/women had FGM, and a significant number of these women (one in nine) are likely to be exposed to another cutting when they need medical intervention in future (Cappa et al., 2019) (Utz-Billing & Kentenich, 2008; Yoder et al., 2013). Victims of FGM suffer health, emotional or and psychological trauma (Odukogbe et al., 2017; Utz-Billing & Kentenich, 2008). The common adverse consequences include bleeding, infections, chronic pains, infertility, obstetric complications, post-traumatic stress disorders, depression, lack of self-esteem, guilty feelings and sexual dysfunction (Farage, Miller et al., 2015; Klein, Helzner, Shayowitz, Kohlhoff, & Smith-Norowitz, 2018; Pycha, Pycha et al., 2018; Sigurjonsson & Jordal, 2018).

Involvement of health workers in the practice of FGM is one of the early interventions that was put forward to reduce harm to girls and women (Utz-Billing & Kentenich, 2008). This strategy was initially a "stop-gap measure" to ensure respect for cultural and religious beliefs and reduction of harm associated with FGM (Bazi, 2017; Kimani & Shell-Duncan, 2018; Nabaneh & Muula, 2019). Medicalisation of FGM was introduced with legislative support and issuance of a tacit supportive statement by some professional organization, or by religious leaders. In some countries such as Somalia and Sudan, health workers were trained on how to perform FGM to minimise harm (Leye, Van Eekert, Shamu, Esho, & Barrett, 2019). However, the United Nations, human right organisations, civil societies and professional organisations rejected medicalisation of FGM (Leye et al., 2019). Specifically, the UN General Assembly passed a resolution in 2012 by declaring FGM as a violation of the human right and further pronounced that all member countries should prioritize and take action towards total eradication/elimination/abandonment of FGM practice including medicalisation (United Nations, 2012; World Health Organisation, 2012).

Research evidence showed that medicalisation agenda of FGM has not reduced the burden and complication appreciably. Although some Nigerian studies showed a reduced rate of complications from FGM performed by health workers, studies from Asia did not show any significant difference between health workers and traditional circumcisers (Obianwu 2018; Onuh et al., 2006). While efforts are being made to discourage FGM practice especially among healthcare workers through legislation and campaigns, health workers are still actively involved in this practice as part of their clinical service (Leye et al., 2019).

Studies from national surveys showed that medicalised FGMs are common in SSA, Middle East and part of Asia (Kimani & Shell-Duncan, 2018; Leye et al., 2019). Worldwide, an estimated 16 million women reportedly (26% of the total burden) procured FGM from healthcare workers, and the majority of these women live in SSA (Kimani & Shell-Duncan, 2018). After the 2012 push back by the United Nations Assembly and her member states against FGM, medicalised FGM is still being reported in several national surveys and individual-level studies in SSA (McCauley & van den Broek, 2019). Some studies showed that continuous involvement of healthcare workers in offering FGM to clients might be due to their belief in such practice, respect for the culture of people in the community, and fear that their clients might consult traditional local circumcisers (Kimani, Esho et al., 2018; Kimani & Shell-Duncan, 2018; Obianwu 2018).

A systematic review in 2017 showed that financial inducement of healthcare workers by people requesting FGM might be one of the key driving motivations for increasing medicalisation of FGM, aside from other factors mentioned in previous studies (Doucet, Pallitto, & Groleau, 2017; Serour, 2013). However, we are not aware of any study that primarily investigated household wealth across countries as an independent risk factor for the medicalisation of FGM in SSA. Early identification of at-risk family in the community might help in instituting early and focused counselling against tempting healthcare workers with money to perform FGM for them. This will help policymakers and experts to develop focused support/intervention to minimise medicalised FGM. Specifically, we hypothesised that the risk of having medicalised FGM by girls and women is associated with the socio-economic status their household belongs.

Methods

Data source

We used the most recent data collected from Demographic and Health surveys conducted between 2010 and 2019 in SSA countries. A major inclusion criterion is that FGM-related data must have been collected in the surveys held between 2010 and 2019 in SSA and available as of December 2019. We examined all DHS data conducted between 2010 and 2019 and identified only 13 countries with information on FGM/C. In all, 13 countries: Burkina-Faso, Cote d'Ivoire, Ethiopia, Gambia, Guinea, Kenya, Mali, Niger, Nigeria, Senegal, Sierra Leone, Tanzania, and Togo were included in this study. Furthermore, we excluded Senegal and Niger from all analysis on medicalisation of FGM because they had zero prevalence. DHS data are cross-sectional, nationally representative and routinely collected in low and middle-income countries across the world. The details of the year of survey and the number of women who participated in the study and the prevalence of FGM and FGM medicalisation are shown in Table 1.

Sampling

All DHS surveys use multistage cluster probability sampling methods to select eligible respondents in each of the countries. The surveys are conducted by trained interviewers using similarly structured questionnaires. The surveys use a set of standardised questions to assess women sexual and reproductive history, attitudes, knowledge and practices and relevant background characteristics.

Measurement of variables

Outcome variable

The primary outcome variable of this study was the medicalisation of FGM. It is a binary outcome extracted from a set of questions. Firstly, all respondents were asked if they have ever had FGM. Those who answered in the affirmative were then asked who performed the cutting. The responses varied from a health professional: doctor, trained nurse/midwife, other health professionals; traditional: traditional 'circumciser', traditional birth attendant, other traditional. Those who had their FGM performed by health professionals were classified as those who had medicalisation of FGM.

Explanatory variables

The explanatory variables are categorised into three levels: individual, neighbourhood and country levels as shown in Fig. 1.

Individual-level factors

The following individual-level factors were included in the models: age (15–19, 20 to 24, 25 to 34 and 35 or older), employment status (working or not working), education (no education, primary or secondary or higher), and wealth index (poorest, poorer, middle, richer and richest), age at first marriage (never, <15, 15 to 19 and 20 years or older) and marital status (currently, formerly and never married).

Neighbourhood-level factors

We used the term "neighbourhood" to describe clustering within the same geographical living environment based on the primary sample unit (PSU) within the DHS data. The neighbourhood-level factors included in this study are a place of residence (rural or urban) and the socio-

Table 1
Pooled Demographic and Health Surveys (DHS) data from 13 sub-Saharan African (SSA) countries, 2010–2018.

Country	Year of Survey	No of neighbourhoods	No of Women	Prevalence of FGM	Prevalence of FGMM	Mean age at FGMM (95% CI)
Nigeria	2018	896	41821	33.8	9.1	2.2(1.7–2.7)
Kenya	2014	1593	31079	21.7	15.1	10.8(10.5–11.1)
Tanzania	2015	608	13266	11.6	2.0	13.2(10.8–15.6)
Senegal	2017	400	16787	25.5	0.0	NA
Ethiopia	2016	643	15683	70.4	1.1	9.3(7.2–11.4)
Gambia	2013	281	10233	75.7	0.3	4.6(2.6–6.6)
Burkina Faso	2010	573	17087	76.1	0.2	3.3(1.1–5.6)
Guinea	2018	300	10874	95.8	18.2	6.5(6.4–6.7)
Cote d'Ivoire	2012	351	10060	40.9	0.3	5.5(2.3–8.6)
Mali	2018	413	10519	92.2	0.4	2.8(0.8–4.7)
Niger	2012	476	11160	4.9	0.0	NA
Sierra Leone	2013	435	16658	89.8	0.8	13.4(12.6–14.2)
Togo	2014	330	9480	6.4	0.5	11.0(5.1–16.9)
All		7299	214,707	51.1	4.2	6.7(6.5–6.9)

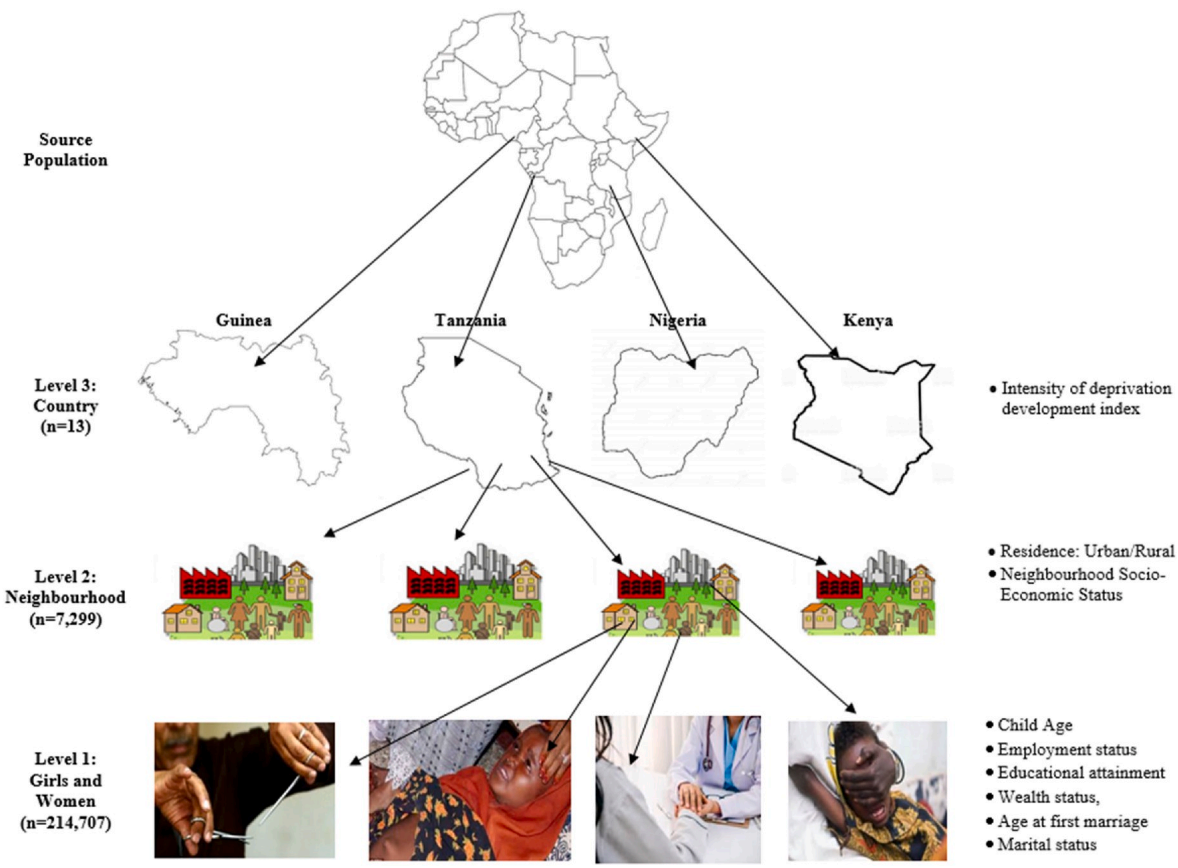

Fig. 1. The hierarchical nature of the data used in this study (Source: Authors drawing).

economic status of the neighbourhoods as a proxy for the neighbourhood socioeconomic (SES) disadvantage. The SES was operationalized with a principal component comprised of the proportion of respondents with no formal education, unemployed, household wealth quintile (asset index below 20% poorest quintile). A standardized score with mean 0 and standard deviation 1 was generated and categorised into 5: 1 (highest) to 5 (lowest).

Country-level factors

We retrieved the country-level variables from the human index reports published by the United Nations database (United Nations, 2018; United Nations Development Programme, 2018). We extracted countries' percentage rural population (United Nations, 2018), and the intensity of deprivation, both been a measure of human development index (HDI) (United Nations, 2018; United Nations Development Programme, 2018). Each of the two country-level factors was then categorised into two (low and high) levels as shown in Fig. 2.

Data analysis

Besides the descriptive statistics to show the prevalence of, and the medicalisation of FGM, we used the multivariable multilevel logistic regression models to identify the contribution of the individual, community and country-level factors associated with the medicalisation of FGM. Senegal and Niger were excluded from the multilevel analysis as they have zero prevalence of medicalisation of FGM. Also, women who have not been circumcised were excluded from further analysis.

We fitted five multilevel binary logistic regression models as shown in Table 3. The first model was the null model (Model I) to assess the variation due to the neighbourhood- and country-specific random effects without any explanatory variable. The second model (Model II)

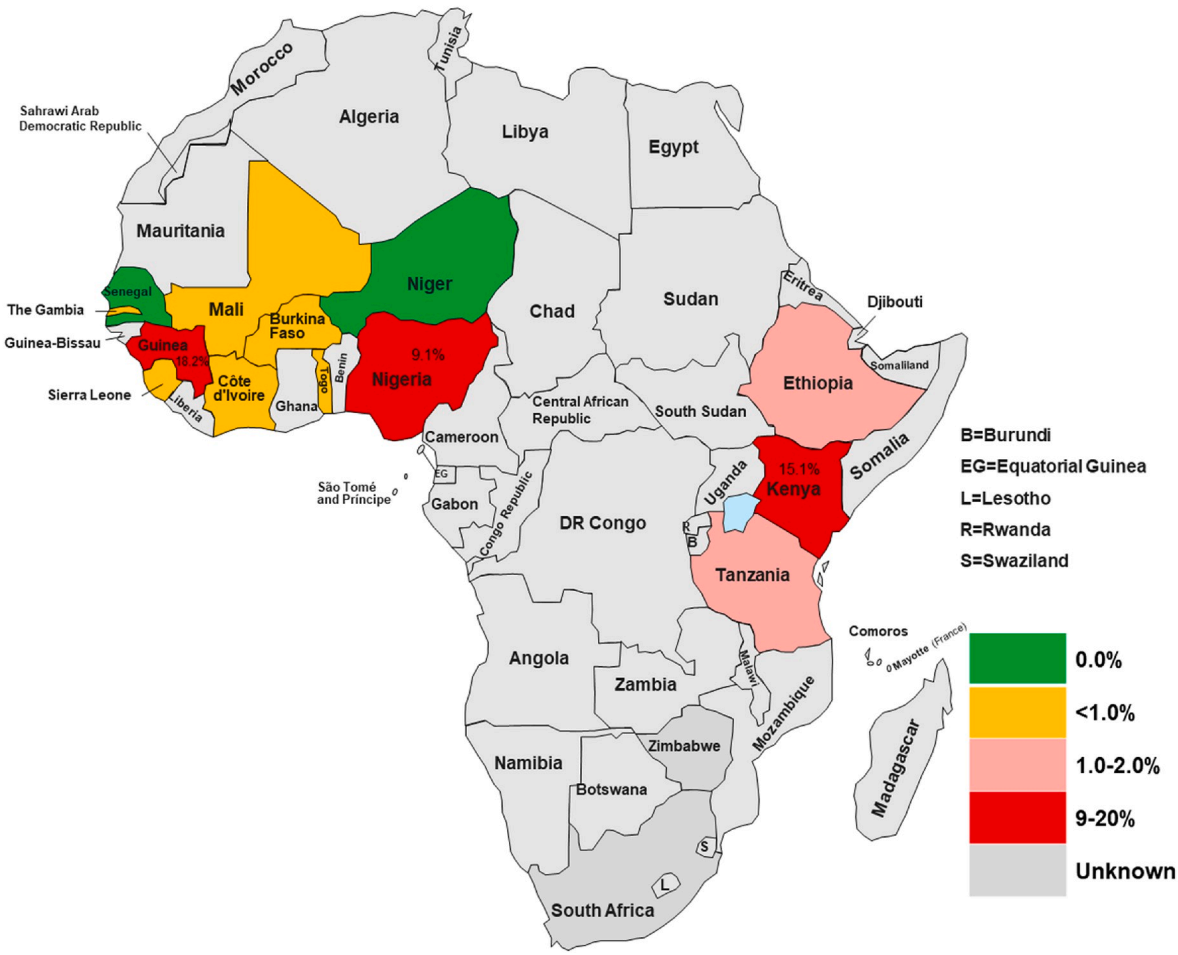

Fig. 2. *Prevalence of FGM Medicalisation in sub-Saharan Countries.*

included only the individual-level variables conditional on the neighbourhood and country-specific random effects. The third model (Model III) included only the neighbourhood level variables conditional on the neighbourhood and country-specific random effects. The fourth model (Model IV) examines the country-level variables conditional on the neighbourhood and country-specific random effects, while the final model (Model V) estimates the odds of individual, neighbourhood and country-level variables conditional on the neighbourhood and country-specific random effects.

The Binomial logit response models were fitted using the MLWin 3.03 module in Stata. The estimation algorithms adopted was the first order marginal quasi-likelihood linearisation (MQL1) using the iterative generalised least squares (IGLS). Multicollinearity was checked using correlation matrix and variance inflation factor (VIF), as a diagnostic approach to omit some of the correlated variables(Tu, Kellett, Clerehugh, & Gilthorpe, 2005). Age at first sex was dropped in the models. The model deviance computed from the -2loglikelihood was used to evaluate how well the different models considered in this study fitted the data. A lower deviance value indicates a better fit of the model.

Fixed effects (measures of association)

The outcomes of the fixed results were reported as odds ratios (ORs) with their 95% confidence intervals (95% CI).

Random effects (measures of variation)

We explored the measures of variations using the variance partition component and median odds ratio (MOR). Adopting the methods recommended by Larsen et al. on neighbourhood effects and reported the random effects in terms of the odds (Larsen & Merlo, 2005). The MORs are the measures of the variance of the odds ratio in higher levels (neighbourhood or country) and it is the median value of the odds ratio between neighbourhoods and countries with higher risk and lower risk of medicalised FGM that can be attributed to any of the neighbourhood and country factors (Larsen & Merlo, 2005). A MOR of 1 is an indication that there is no increased risk in medicalised FGM between neighbourhoods or countries. The higher the MOR, the more significant is the risk of medicalised FGM when one move to another neighbourhood or country with a higher propensity for medicalisation. Earlier studies had used a similar approach (Uthman, Ekstrom, & Moradi, 2016; Uthman, Sambala et al., 2018).

Ethical clearance

The data originator (ICF macro and population commission of each country) had obtained ethical clearance to conduct these surveys. Prior to each interview, participants gave informed consent to participate in the survey. DHS Program is consistent with the standards for ensuring the protection of respondents' privacy. The full details can be found at http://dhsprogram.com.

Results

The countries, year of data collection, number of women and the weighted prevalence of FGM and the prevalence of FGM medicalisation are listed in Table 1. A total of 13 SSA was included. We analysed information on 214,707 women (Level 1) nested within 7299 neighbourhoods (Level 2) from 13 SSA countries (Level 3) for the univariate and 66,277 women (Level 1) nested within 5075 neighbourhoods (Level 2) from 11 SSA countries excluding Senegal and Niger (Level 3) for the multivariable analysis. In Table 1 Sierra Leone and Guinea with FGM prevalence of 90% had less than 1% medicalisation. Nigeria had 40% and Kenya had 22% FGM prevalence but had around 9% and 15% FGM medicalisation, respectively (Fig. 2).

The descriptive statistics on background characteristics, prevalence and medicalisation of FGM were presented in Table 2. More than half (56.2%) of women aged 35–49 years had FGM, while 46.6% of FGM were among 15 to 19-year-old women. The overall mean (95% CI) age at medicalisation of FGM was 6.7(6.5–6.9), lowest (2.2(1.7–2.7) years) among Nigerian women and highest among Tanzanian (13.2(10.8–15.6) years) and Malian (13.4(12.6–14.2) years) women (Table 1). The prevalence of FGM increased with age while medicalisation decreased with age. Medicalisation was higher among women who had never gotten married (8.8%) and among women who had their first marriage after attaining 20 years of age (4.7%) compared to women who had their first marriage between ages 15–19 years (2.5%) and before age 15 (2.4%). FGM was higher among women who had no formal education (66.5%), but FGM medicalisation increased with the level of education.

Table 2
Frequency Distribution of Respondent by Background characteristics.

Background Characteristics	No of women	Prevalence of FGM	Prevalence of FGM Medicalisation
Individual-level			
Age			
15–19	44,141	46.6	6.5
20–24	38,276	47.4	4.9
25–34	70,244	51.2	4.1
35–49	62,046	56.2	2.6
Age at first marriage			
Never	53,587	40.1	8.8
<15	27,339	61.4	2.4
15–19	84,487	57.6	2.5
20+	46,294	46.6	4.7
Education			
No education	92,328	66.5	2.0
Primary	54,936	38.2	4.6
Secondary	55,017	39.9	8.3
Higher	12,404	31.8	17.4
Marital status			
Currently	146,990	55.7	3.0
Formerly	14,131	44.5	3.7
Never	53,586	40.1	8.8
Religion			
Catholic	19,327	35.7	5.8
Other Christians	60,564	36.4	6.9
Islam	103,737	68.2	3.7
Others	6580	46.2	0.7
Occupational status			
Working	133,268	53.0	3.8
Not working	81,439	47.9	4.8
Wealth Quintiles			
Poorest	36,802	60.4	1.5
Poorer	39,246	56.1	2.3
Middle	40,998	54.2	3.0
Richer	44,879	49.4	5.1
Richest	52,782	40.9	8.6
Community-level			
Type of place of residence			
Rural	131,507	56.4	7.4
Urban	83,200	43.5	2.5
Community SES			
High	28,708	44.4	10.3
2	24,890	53.3	6.0
3	24,070	60.2	3.4
4	23,881	62.4	2.1
Low	21,580	62.7	1.2
Country-level			
Deprivation Intensity			
Low deprivation	14,036	21.7	15.1
High deprivation	109,093	60.4	3.9
Rural percentage			
Low rural %	19,373	58.9	0.3
High rural %	103,756	55.4	5.3

The prevalence was 17.4% among women who had tertiary education, 8.3% among women who had secondary education, 4.6% among primary school holders and 2.0% among women who had no education. The prevalence of medicalisation increased with wealth; the prevalence among women from the families with the richest quintile was 8.6% while those from the poorest wealth quintile families was 1.5%. Medicalisation increases with community socio-economic status, women in the highest community SES had a prevalence of 10.3% compared to 1.2% in the communities with the lowest SES. On the country-level, almost two thirds (60.4%) of women in countries with high intensity of deprivation have had FGM compared with 21.7% in countries with low intensity of deprivation but the reverse was the case for the medicalisation with 3.9% versus 15.1% respectively. Medicalisation was higher among women in countries with a high rural population (5.3%) compared with those with a low rural population (0.3%).

We explored five different and distinct models: (i) null model without any determinant variables (ii) only the individual-level factors (iii) only the neighbourhood-level factors, (iv) only the country-level factors and (v) full model which included all individual-, neighbourhood- and country-level factors at the same time.

In the null model, the percentage total variation attributable to variation between countries is 19.5 (95% CI: 3.6 to 30.2) and a median odds ratio of 3.9 (95% CI: 1.7 to 6.5). Similarly, a high percentage of total variation due to variation between neighbourhood was observed (VPC = 68.9; 95% CI: 61.3 to 74.9) and a median odds ratio (MOR = 10.1; 95% CI: 9.2 to 10.8).

Model I to Model V had similar model random effects estimate and significance. In the full model consisting of the individual-, neighbourhood- and country-level factors, younger women were more likely to have had medicalisation performed compared to women aged 35–49 years. Women who were never married (OR = 1.3; 95% CI: 1.1 to 1.5) were significantly more likely to have medicalisation. Women education increases the odds of FGM medicalisation; women with primary education (OR = 1.4; 95% CI: 1.3 to 1.6), secondary education (OR = 1.8; 95% CI: 1.6 to 2.0) and tertiary education (OR = 2.2; 95% CI: 1.8 to 2.7) have higher odds of FGM medicalisation compared to women with no education. Similarly, the odds of FGM medicalisation increases with the wealth status of the household from which a woman comes from with 29%, 45%- and 75%-times higher odds in the middle, richer and richest household wealth quintiles respectively than those from the poorest households. At the neighbourhood levels, the odds of women in the urban areas (OR = 0.5; 95% CI: 0.4 to 0.7) to have had FGM performed by medical personnel were lower than in rural areas. The odds of having FGM medicalisation increases with community SES compared with women in the high SES neighbourhoods having higher odds of medicalisation compared with those from the least SES neighbourhoods. Women in countries with a high percentage of the rural population have a higher odds (OR = 15.2; 95% CI: 2.0 to 118.1) of medicalisation compared to countries with a low percentage of the rural population.

The percentage total variation attributable to variation between countries is (VPC = 19.5; 95% CI: 3.5 to 30.1) and a median odds ratio (MOR = 3.4; 95% CI: 1.6 to 5.4). Similarly, a high percentage of total variation due to differences between neighbourhoods was observed (VPC = 61.6; 95% CI: 52.1 to 68.0) and a median odds ratio of 6.1 (95% CI: 5.6 to 6.4). In all, the full model (Model V) fitted the data most as it has the lowest deviance value among the five models.

Discussion

It is apparent from the analyses of data from eleven countries in SSA that FGM performed by healthcare workers had a direct relationship with the level of socioeconomic status irrespective of country of location and place of residence. Specifically, the report of FGM performed by health worker was commonest among women from the highest wealth quintiles compared to those with the poorest wealth quintiles. Similarly, medicalised FGM also had a direct relationship with the level of

Table 3
Individual compositional and contextual factors associated with medicalisation of FGM identified by multivariable binomial multilevel logistic regression models, DHS data, 2010–2018.

Characteristics	Model I	Model II	Model III	Model IV	Model V
	OR (95% CI)	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*
Age					
15–19		**1.67(1.43–1.95)**			**1.79(1.52–2.10)**
20–24		**1.68(1.47–1.93)**			**1.77(1.54–2.04)**
25–34		**1.61(1.43–1.81)**			**1.65(1.47–1.85)**
35–49		**Reference**			**Reference**
Age at first marriage					
Never		**1.29(1.12–1.49)**			**1.29(1.11–1.49)**
<15		**0.84(0.71–0.99)**			0.86(0.73–1.03)
15–19		0.94(0.83–1.05)			0.96(0.86–1.08)
20+		**Reference**			**Reference**
Mother's education					
No education		**Reference**			
Primary		**1.59(1.41–1.79)**			**1.41(1.25–1.60)**
Secondary		**1.98(1.75–2.23)**			**1.75(1.55–1.98)**
Higher		**2.40(1.97–2.92)**			**2.19(1.79–2.66)**
Marital status					
Currently		**Reference**			
Formerly		1.05(0.87–1.27)			1.01(0.84–1.21)
Never		1.00(1.00–1.00)			1.00(1.00–1.00)
Occupational status					
Work (vs no work)		**1.11(1.01–1.21)**			**1.15(1.05–1.27)**
Wealth Quintiles					
Poorest		**Reference**			
Poorer		**1.48(1.24–1.78)**			**1.15(0.95–1.41)**
Middle		**1.95(1.64–2.33)**			**1.29(1.06–1.58)**
Richer		**2.46(2.06–2.94)**			**1.45(1.18–1.78)**
Richest		**3.11(2.57–3.76)**			**1.75(1.40–2.19)**
Neighbourhood-level					
Place of residence					
Urban vs rural			**0.58(0.43–0.77)**		**0.52(0.39–0.68)**
Community SES					
High			**16.08(10.76–24.03)**		**7.43(5.00–11.04)**
2			**9.92(7.06–13.94)**		**5.26(3.78–7.32)**
3			**4.63(3.47–6.18)**		**2.83(2.13–3.76)**
4			**2.35(1.74–3.18)**		**1.76(1.32–2.34)**
Low			**Reference**		**Reference**
Country-level					
Deprivation Intensity					
Low depr (vs high)				2.58 (0.2–35.04)	2.80(0.19–41.4)
Rural percentage					
High rural % (vs low)				**16.51(2.27–120.13)**	**15.2(1.96–118.14)**
Random effects					
Country-level					
Variance (95 CI)	2.06(0.31–3.82)	2.14(0.32–3.95)	2.11(0.32–3.90)	1.56(0.23–2.90)	1.67(0.24–3.10)
VPC (%)	19.47(3.64–30.19)	22.97(4.44–34.74)	21.07(4.04–32.22)	17.52(3.15–27.61)	19.5(3.49–30.08)
MOR (%, 95% CI)	3.93(1.7–6.45)	4.02(1.72–6.64)	4(1.72–6.58)	3.29(1.58–5.08)	3.43(1.6–5.35)
Explained variation (%)		-3.4(-3.14–3.23)	-2.43(-2.09–3.23)	24.27(24.08–25.81)	18.93(19.11–22.58)
Neighbourhood-level					
Variance (95 CI)	5.23(4.92–5.54)	3.85(3.59–4.11)	4.61(4.31–4.91)	4.05(3.79–4.32)	3.60(3.34–3.87)
VPC (%)	68.89(61.32–73.98)	64.49(54.29–70.97)	67.12(58.44–72.79)	63.02(54.97–68.65)	61.55(52.09–67.95)
MOR (%, 95% CI)	8.86(8.28–9.44)	6.5(6.09–6.92)	7.75(7.24–8.28)	6.82(6.4–7.24)	6.11(5.72–6.56)
Explained variation (%)		26.39(25.81–26.88)	11.85(11.37–12.22)	22.56(22.2–22.81)	31.17(29.78–31.98)
Model fit statistics					
Deviance (-2LL)	12255.63	11824.23	12125.13	13214.22	11188.23
Sample size					
Country-level	11	11	11	11	11
1Neighbourhood-level	5075	5075	5075	5075	5075
Individual-level	66277	66272	66277	66277	66272

OR odds ratio, CI confidence interval, MOR median odds ratio, VPC variance partition coefficient.
The OR in bold suggest significance at 5%.
[a]Model I – empty null model, baseline model without any explanatory variables (unconditional model).
[b]Model II – adjusted for only individual-level factors.
[c]Model III– adjusted for only neighbourhood-level factors.
[d]Model IV – adjusted for only country-level factors.
[e]Model V – adjusted for individual-, neighbourhood-, and country-level factors (full model).

education of the women with the highest report among those with higher -post-secondary -education. However, there was a higher report of FGM performed by health care workers among the younger generation of women than the older generation of women in these analyses. Although, medicalised FGM was more commonly reported by single women compared to those in marital union, but this observation was not statistically significant. The study also showed that there might be variation in the degree of association between the rate of medicalised

FGM and socioeconomic status across the 11 eleven countries considered in this analysis.

Although FGM is a socio-cultural practice, findings from our analyses suggest that there might be other drivers for the practice among women. High socioeconomic status and education have been largely associated with better access to health information, health-seeking behaviour and quality of healthy living (Chan, Lee, & Low, 2018; Latunji & Akinyemi, 2018). The general belief is that women are vulnerable to harmful traditional practices because of their low social status in the society, poor education and poverty. However, in this study, we observed contrary to the general norm that women whose family were ranked with the highest socioeconomic status and education were not protected from the cultural practice of FGM. While other women sought FGM from traditional practitioners in their communities, women whose family were of high social class might have facilitated this cultural practice during visits to their healthcare practitioners. Generally, skill acquisition to perform FGM is not part of the pre-service training curriculum of any medical professionals in SSA, but some health workers acquire this skill through interaction with their colleagues in their communities that illegally engage in it.

Among the thirteen countries that had data on FGM that were performed by health workers, women from Guinea, Kenya and Nigeria had a relatively high prevalence of 18.2%, 15.1% and 9.1%, respectively. The relatively high proportion of medicalised FGM in these countries are not known. More so that health workers in these countries did not receive any pre-service training on how to perform FGM like other countries in SSA. Though, the government of Guinea, Nigeria and Kenya criminalised FGM in its entirety in 2016, 2015 and 2011, respectively, these countries do not have national implementation strategy to enforce these laws to eliminatethis harmful cultural practice (UN Population Fund (UNFPA) (2018). None of these three countries has successfully prosecuted any healthcare providers that performed FGM (UN Population Fund (UNFPA) 2018). In fact, there was a report of a medical practitioner that challenged the law criminalising FGM in Kenya because she felt that the law is infringing on the fundamental human right of people (Muthini, 2018).

The findings from these analyses have some limitations. The analyses did not have information on reasons why women with high socioeconomic status and education had a higher risk of medicalised FGM than those women from lower or poorest status. Some studies showed that women with high socioeconomic class still prefer their cultural values and would not mind inducing health workers to "safely" perform FGM for their children. The women believed that the performance of FGM by health workers might not be associated with complications such as bleeding and infections. A systematic review in 2017 showed that some health workers clandestinely performed FGM for economic reasons and to protect the right of people in their environment (Doucet et al., 2017). The cross-sectional design of the NDHS data makes it impossible to draw causality between the risk of medicalised FGM as an outcome and the selected explanatory variables. There is also a plausibility of under-reporting of FGM in SSA because of the existing laws that had criminalise FGM practice by the traditional healers and health workers in these countries. Notwithstanding, this study has a number of strengths. The study used a large pooled nationally representative datasets from 11 countries to test the hypothesis between the report of medicalised FGM and explanatory variables. We used multilevel analyses to check for the effect of the individual, neighbourhood and country levels with the risk of reporting medicalised FGM, this statistical approach makes the findings generalisable (Uthman et al., 2016; Uthman, Sambala et al., 2018).

In conclusion, medicalised FGM is a common practice among women from a high socioeconomic and educational background in SSA. Medicalisation of FGM is highly prevalent among women of high social class and those residing in rural areas. Medicalised FGM was found to be highest in Guinea, where nearly all women had FGM among which a fifth was medicalised, followed by Nigeria and Kenya, despite the availability of laws banning FGM practice in these countries. We recommend that the government should initiate a culturally sensitive policy that will discourage perpetuation of FGM, particularly by healthcare providers. Future studies should focus on identifying drivers of FGM among the high social class families in the society in SSA. We recommend more study, particularly qualitative research in order to understand the real reason why medical practitioners succumb to pressure to offer FGM services in their localities.

Ethical approval

Ethical approval is not needed, the study used secondary data from the Demography Health Surveys (DHS). The DHS program maintain strict standards for protecting the privacy of respondents. Each country-specific DHS survey protocols are reviewed by the ICF and Institutional Review Board (IRB) in each country to ensure that the survey complies with the regulations for the protection of human subjects and ensures that the survey complies with laws and norms of each country.

Declaration of competing interest

The authors declare that they have no competing interests.

Ethical approval

Ethical approval is not needed, the study used secondary data from cross-sectional surveys.

Data sharing

The data supporting this article is available at: http://dhsprogram.com/data/available-datasets.cfm, which can be downloaded after request from the DHS website.

Contributors

IOMB conceptualised and design the study, contributed to the interpretation of findings and writing of initial draft. AFF contributed to the design, methodology, statistical analysis, interpretation of findings and writing of the initial draft. YOK contributed to design of the study, methodology, statistical analysis, interpretation, and writing of the initial draft. OAO contributed to the design and revision of the manuscript. All authors wrote, read and approved the final manuscript.

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