



Attitudes towards female genital cutting among adolescents in rural Burkina Faso: a multilevel analysis

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Abstract

OBJECTIVE Despite decades of abandonment efforts, female genital cutting (FGC) prevalence rates in Burkina Faso remain high. We present updated prevalence data from rural adolescents and examine factors associated with FGC receipt and attitudes, testing predictions of social convention and modernisation theory regarding the abandonment process.

METHODS We interviewed 1644 adolescents aged 12–20 years from 10 villages and one sector of Nouna town in the Nouna Health and Demographic Surveillance site in late 2017. Response-weighted prevalence for self-reported FGC receipt, beliefs about religious requirements, and attitudes about abandonment were calculated. We used bivariate regression and two-level hierarchical models to test whether social convention or modernisation theory-related factors predicted current FGC attitudes.

RESULTS 43% of women in our sample reported having undergone FGC; 74% of women and 76% of men believed FGC should be abandoned. The strongest predictors of FGC receipt were religion, ethnicity, the village's FGC rate and mother's education. The strongest predictors of FGC abandonment attitudes were religion, ethnicity, belief that FGC is religiously required, and own FGC status. Males' attitudes were less determined by community factors than females'; females' attitudes were more strongly influenced by factors linked to modernization, such as maternal education and household wealth.

CONCLUSIONS FGC continues to be common in rural and small-town Burkina Faso, and our analysis suggests that social conventions play an important role in its continuation. However, modernisation-related factors were stronger predictors of abandonment attitudes than of FGC status, particularly in adolescent women. The changes these relationships suggest may benefit the next generation of girls.

keywords Burkina Faso, female genital cutting, social convention theory, modernisation theory, adolescents

Sustainable Development Goals (SDGs): SDG 3 (good health and well-being), SDG 5 (gender equity), SDG 10 (reduced inequalities), SDG 17 (partnerships for the goals)

Introduction

Female genital cutting (FGC; also called female genital mutilation or female circumcision) describes “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”. It affects more than 200 million girls and women worldwide [1]. FGC appears to be becoming less common [2–5], but it remains a serious concern for health and mental well-being in many communities.

The United Nations and WHO recognise FGC as a human rights violation and its elimination is part of the Sustainable Development Goals [6]. FGC is conducted by many ethnic groups in 27 African countries, Iraq, Yemen and Indonesia, and elsewhere in migrant populations from FGC-practicing communities [7,8]. Opposition to FGC is based on the principles of gender equity, bodily autonomy and “physical and mental integrity” [1,9].

Reasons for FGC vary across contexts and individuals, but are characterised by sociocultural factors [10]. FGC

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is believed to ensure virginity before marriage, promote sexual restraint, improve marriage prospects, enhance fertility and prepare a girl for her role as a wife and mother [3,11–21]. It is perpetuated by religion [3,16], despite predating all major religions [22,23]. The physiological and psychological consequences of FGC are substantial [24–26], but in FGC-practising communities they are often disregarded, disconnected from the practice, or perceived to be outweighed by benefits [27]. Efforts to curb the practice of FGC have been limited by the lack of both contextual knowledge of its drivers and theory-based interventions and policies [28]. FGC is deeply rooted in society, cultural identity and tradition and not merely perpetuated by a lack of education on the health consequences [29,30].

Two broad theories have been proposed to explain how FGC arises and persists. The first is social convention theory (SCT), which focuses on game theory and FGC as a social norm [12,13]. SCT originally hypothesised that in poor or unequal settings, FGC emerged as a means of signalling fidelity and became a competitive advantage in the marriage market. An alternative version of SCT argues that FGC allows recipients to join established female social networks by showing deference in undergoing cutting [18]. Following SCT, FGC abandonment requires a coordinated effort by FGC-practising community members to create marriage markets or social networks in which FGC is not required. Under SCT, key predictors of FGC include predominant religion [31], ethnicity [32] and the proportion of the population already cut [33].

The second category of FGC persistence theories is individualistic decision-making models, linked to modernisation and feminism and focusing on women's empowerment and autonomy. These theories posit that urbanisation, education and increased wealth will gradually erode FGC by enabling individuals to challenge traditional values and norms [13,34]. Evidence for modernisation theory is mixed. Urban residence is generally, but not always, associated with lower FGC prevalence and less support for its continuation [4,35,36]. Greater wealth is also inconsistently associated with lower FGC levels [2–5]. More-educated women are more likely to report opposing FGC continuation and having uncircumcised daughters [4,14,34,37], although there are exceptions [3,5,35]. Finally, media exposure is usually associated with pro-abandonment attitudes [38–40], again with exceptions [41].

Positing a single theory to explain FGC dynamics is difficult: circumcision norms vary between countries, regions and even neighbouring villages. While much evidence points to FGC being a social convention, there is also

evidence that individual factors matter. One study of FGC support in West Africa found that, in contradiction to SCT, 87% of the variation in FGC persistence was attributable to household and individual-level factors [42]. Similarly, the smooth distribution of village-level FGC rates in Sudan, rather than the very high or very low rates that SCT would predict [43], suggests a more complex aetiology.

FGC in Burkina Faso

Burkina Faso is considered a moderately high FGC prevalence country, with a self-reported prevalence among women aged 15–49 of 76% in 2010 [44]. The country was one of the first to pass a law against FGC in 1996 [45] and support for FGC is low – only 9% of girls and women and 10% of boys and men believed the practice should continue in 2010 [44]. In 2010, FGC prevalence was lower for younger women (89% in 45–49 year olds, 58% for 15–19 year olds, and 26% for 10–14 year olds), suggesting that abandonment is happening, albeit not as rapidly as SCT predicts. In recent years, however, FGC eradication efforts have slowed [46].

Several studies have examined factors associated with FGC in Burkina Faso [3–5,31,47,48]. However, research on Burkinabé FGC-related attitudes is scarce and past data was largely obtained by asking mothers about their circumcision intentions and their daughters' FGC receipt. In this study, we aimed to test the extent to which social convention and modernisation theories explain FGC attitudes in rural Burkina Faso, by evaluating whether FGC receipt and attitudes are associated with relevant exposures. The range of religions and ethnicities at our study site makes it ideal for examining how both individual and community factors affect FGC.

Methods**Setting and sample**

Our data are drawn from an exploratory, cross-sectional study of adolescents aged 12–20 in rural Burkina Faso. This Burkina Faso study was conducted as part of the Adolescent Health Study conducted by the Africa Research, Implementation Science and Education (ARISE) Network, a collaboration between nine sub-Saharan African institutions, the Harvard T.H. Chan School of Public Health, and the University of Heidelberg [49]. The Burkinabé study was carried out at the Centre de Recherche en Santé de Nouna (CRSN), a Health and Demographic Surveillance System (HDSS) site in Boucle du Mouhoun province, north-western Burkina Faso [50]. The HDSS comprises the town of Nouna and 59

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surrounding villages with a total population of ~ 107,000. Most inhabitants are Muslim or Roman Catholic, although some are Protestant or Animist; several ethnicities are present.

We used a two-part stratified sampling procedure to ensure the sample mirrored the HDSS site in terms of ethnicity, religion and urbanicity. First, we purposively selected 10 rural villages within the census area as strata, to ensure all five main ethnicities were included. We then randomly sampled 1795 individuals from all children who would be aged 12–19 years on 1 October 2017 in these 10 villages, based on data from the 2015 HDSS census. Second, we drew a simple random sample of 749 age-eligible adolescents from one sector of Nouna town, to ensure urban representation. Regional and national representation cannot be assumed, however.

We collected data in November and December 2017 using tablet computers around adolescents' place of residence. Questions were either asked in French or translated into Dioula or Mooré, the most frequently spoken (but rarely written) local languages by fieldworkers. Fieldworker training included translation practice.

Ethics

The Institutional Ethics Committee of the CRSN approved this study; it was exempted from review by the Heidelberg Medical Faculty's Ethics Commission due to the anonymised nature of all data received in Germany. Oral assent was sought from village elders. Written informed consent was obtained from each participant. Parents or guardians provided consent for respondents aged under 18, alongside the minor's written assent. In cases of illiteracy, a literate witness assisted. Performing FGC is illegal in Burkina Faso, and there have been recent arrests and trials in Boucle du Mouhoun. Where concerns arose, meetings were held with village elders and household heads to assure them of the study's confidentiality.

Measures

The study collected self-reported information on socio-demographics, behaviours, health practices and health outcomes using a questionnaire that was largely derived from the Global School-Based Student Health Survey with some additional questions included [49].

Outcomes. FGC questions were taken from the 2010 Burkina Faso Demographic Health Survey [44]. Respondents were asked if they had heard of FGC or "excision," the common local French term; follow-up questions were asked of those who had heard of at least one of these two

terms. Women were asked if they had been cut – and, if so, (i) whether their genital area had just been nicked, (ii) whether any flesh had been removed or the genital area had been sewn closed, (iii) at what age FGC had occurred, and (iv) who had performed the FGC.

Our first outcome measure was "FGC receipt," a binary variable reflecting receipt of any type of circumcision; those who were unsure were considered non-recipients. Our second outcome measure was "FGC abandonment," a binary variable reflecting affirmation of the belief that FGC should be abandoned versus any other response (FGC should be continued; it depends; don't know); we collapsed these categories since our focus was on clear opposition to FGC. We also asked respondents whether they thought FGC was a religious requirement, grouping those with no religion with negative responses, since the latter cannot believe FGC to be a religious requirement.

Exposures. We considered several variables predicted to affect FGC under modernisation theory. These included sociodemographic characteristics: age (12–13, 14–15, 16–17, or 18–20), religion (Muslim, Catholic, Protestant, or Animist), current enrolment in school and years of full-time education, marital status (single or ever engaged/married), ethnicity, and urbanicity (Nouna residence). Household wealth was calculated from the leading component of a principal component analysis of household assets [51], splitting the sample into quintiles. Media exposure was measured by summing six binary variables: any Internet access, any TV access, any social media use, reading magazines \geq weekly, listening to radio \geq weekly, and having contact with anyone outside Burkina Faso. We also included parents' ages, parents' educational attainment (none, primary, post-primary or higher, and not applicable), and respondent's residence with their mother (as a measure of intergenerational transmission of ideas).

We additionally considered two community variables to test SCT hypotheses: the proportion of village/sector residents who were Muslim (based on the 2015 HDSS census) and the proportion of female village/sector respondents to this survey who reported FGC receipt. To test for social desirability bias in reporting FGC receipt and attitudes, we included the Balanced Inventory of Desirable Responding short-form (BIDR-16) [52]. For the analysis, we generated quintiles of the leading principal component from a principal component analysis of all 16 items of the BIDR-16.

Statistical analysis

We first described FGC prevalence and the covariate distributions. We then used bivariate logistic regression and

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	All respondents	Female	Male
N	1644	696	949
Age			
12–13 years	27.6%	28.2%	27.0%
14–15 years	25.3%	25.1%	25.5%
16–17 years	24.0%	24.5%	23.4%
18+ years	23.2%	22.3%	24.2%
Education			
Currently in school	49.0 %	51.7%	46.4%
Years of full-time education [†]	5.1 (3.7)	5.2 (3.7)	5.1 (3.8)
Ever engaged or married	9.8%	18.7%	0.9%
Religion			
Muslim	68.9%	67.7%	70.2%
Catholic	20.9%	22.2%	19.7%
Protestant	7.0%	6.9%	7.2%
Animist	3.1%	3.2%	3.0%
Ethnicity			
Bwaba	36.8%	36.1%	37.4%
Dafin	20.1%	21.7%	18.5%
Mossi	19.3%	19.8%	18.7%
Peulh	10.9%	11.0%	10.8%
Samo	11.3%	9.5%	13.1%
Other	1.7%	1.9%	1.5%
Media exposure (range 0–6) [†]	1.60 (1.04)	1.35 (0.90)	1.85 (1.10)
Wealth			
Lowest quintile	19.7%	17.3%	22.0%
Second quintile	20.1%	21.9%	18.2%
Third quintile	21.6%	21.3%	22.0%
Fourth quintile	18.5%	19.2%	17.8%
Highest quintile	20.1%	20.3%	20.0%
Rural residence	70.3%	70.7%	29.3%
Parents' education		Mother/Female guardian	Father/Male guardian
None		84.0%	72.1%
Primary		10.2%	14.6%
Post-primary		2.0%	5.4%
Secondary or technical		0.2%	2.4%
Not applicable/no parent		3.6%	9.0%

All results are adjusted for survey weights. Figures are percentages except †, which are means and standard deviations.

multivariable hierarchical regression analysis (individuals nested within villages) with random village-level intercepts, to identify factors associated with FGC receipt and FGC abandonment attitudes. For the hierarchical models, we first estimated village-level variance in an empty model using intraclass correlation coefficients (ICC). For the final multivariable regression models, we sequentially added individual-level variables, household-level characteristics, and the proportion of women in each community who were cut. FGC receipt models included only women; we re-ran the final FGC abandonment model separately for men and women to evaluate effect modification.

Data were analysed using Stata version 14.2 (Stata-Corp; College Station, TX). All analyses were adjusted for survey non-response using inverse weights accounting for differential participation by age, religion, ethnicity and village/town.

Results

We contacted 1674 of 2544 sampled individuals (65.8%), of whom 1644 (98.2%) consented to participate (Table 1). More male adolescents than female adolescents were located and consented. Half of the respondents were enrolled in school at the time of

Table 2 Responses to female genital cutting questions

	All respondents	Female	Male
Heard of female genital cutting (FGC)	74.2%	78.2%	70.3%
Heard of excision	66.0%	65.8%	66.3%
Heard of either FGC or excision	78.4%	82.8%	74.0%
Respondent circumcised		43.2%	
Of those who are cut:			
Flesh was removed			
Yes		69.6%	
Don't know		23.6%	
Genital area was nicked only			
Yes		20.8%	
Don't know		30.3%	
Genital area was sewn closed			
Yes		2.0%	
Don't know		21.9%	
Who performed circumcision			
Traditional circumciser		95.8%	
Traditional birth attendant		1.6%	
Nurse/midwife		1.1%	
Other		1.6%	
Age at cutting			
0–4 years		54.0%	
5–9 years		39.5%	
10–14 years		6.2%	
15+ years		0.3%	
Of those who had heard of cutting/excision:			
Cutting required by religion			
Yes	28.5%	30.3%	26.5%
Don't know	12.5%	14.8%	10.0%
No/no religion	59.0%	54.9%	63.5%
Cutting should be abandoned			
No	16.2%	17.2%	15.1%
Depends	2.8%	2.5%	3.2%
Don't know	5.7%	5.9%	5.4%
Yes	75.3%	74.4%	76.3%

All results are adjusted for survey weights.

interview and most respondents' highest educational attainment was primary school; parental education levels were even lower. Almost 20% of women but <1% of men were engaged or married.

Most participants had heard of FGC (Table 2): 73% of “female genital mutilation/cutting” and 66% of “excision”. 43% of female adolescents had undergone FGC, mostly before age six (Figure 1). Almost all FGC had been conducted by a traditional circumciser. A large majority of both men and women thought FGC should be abandoned (Figure 2), while a minority believed that it is required by religion. FGC receipt and attitudes varied widely by ethnicity, religion and village: village-

level FGC prevalence ranged from 0% to 83% and pro-abandonment attitudes ranged from 8% to 91%.

FGC was more common among older respondents, among Muslims, and in specific ethnic groups (Table 3). FGC was less common if parents had post-primary education and uncut girls were more likely to be currently enrolled in school. FGC status was not associated with current household wealth or size, or living in Nouna, but it was strongly associated with village-level FGC prevalence. Being cut, believing that FGC is a religious requirement, and education were strongly associated with FGC abandonment attitudes, but age was not associated with abandonment attitudes. Both personal Catholicism and Protestantism were associated with being in favour of abandoning FGC, as was lower village-level Muslim proportion. There were no significant differences in FGC abandonment attitudes by exposure to media, urban/rural location, household or community wealth, household size or employment status. Bivariate associations did not differ greatly by gender.

In hierarchical models, 45% of variation in FGC receipt was at the village level. Adding individual-level characteristics dropped the ICC to 11% (Model 1, Table 4), with Protestant religion and Bwaba ethnicity both being strongly negatively associated with FGC receipt. Daughters of parents with at least post-primary education, but not those living in wealthier households, had significantly reduced odds of FGC receipt (Model 2). A 10-percentage point increase in community FGC prevalence was associated with 1.63 times the odds (95% confidence interval 1.36–1.97) of FGC receipt (Model 3).

For FGC abandonment, 9% of variation was at the village level. Being older, currently enrolled in school and of Protestant faith, each increased the odds of thinking FGC should be abandoned; belief that FGC is a religious requirement was negatively associated with favouring abandonment (Model 1, Table 5). Household wealth was positively associated with preference for abandonment (Model 2) but community-level factors were not associated with FGC abandonment attitudes (Model 3).

Predictors of FGC attitudes in multivariable models differed by gender (Table 5, Models 3a and 3b). Communities accounted for more attitude variation among female adolescents (16%) than male adolescents (4%). Believing FGC to be a religious requirement predicted attitude more strongly for male adolescents, as did Protestant faith. Among female adolescents, maternal primary education increased the probability of favouring abandonment, but post-primary education decreased it. Finally, female adolescents (but not male adolescents) in wealthier households and communities with higher FGC rates were more likely to favour abandonment.

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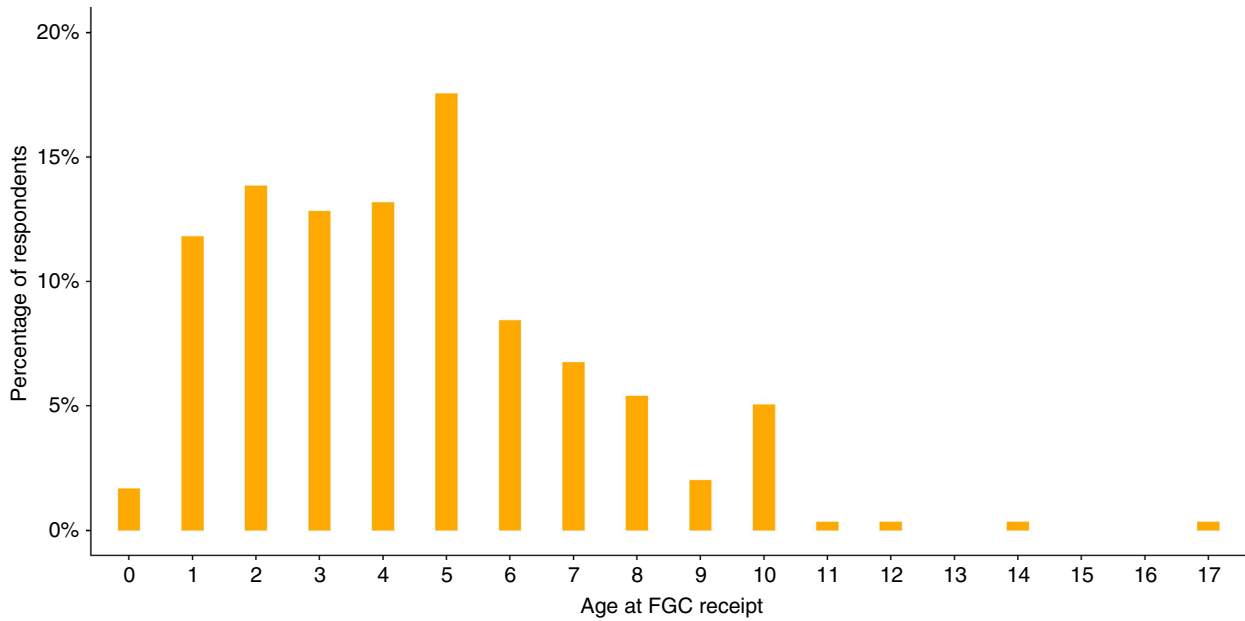


Figure 1 Distribution of ages at which female respondents reported receiving female genital cutting in the Nouna Health and Demographic Surveillance System in Burkina Faso [Colour figure can be viewed at wileyonlinelibrary.com]

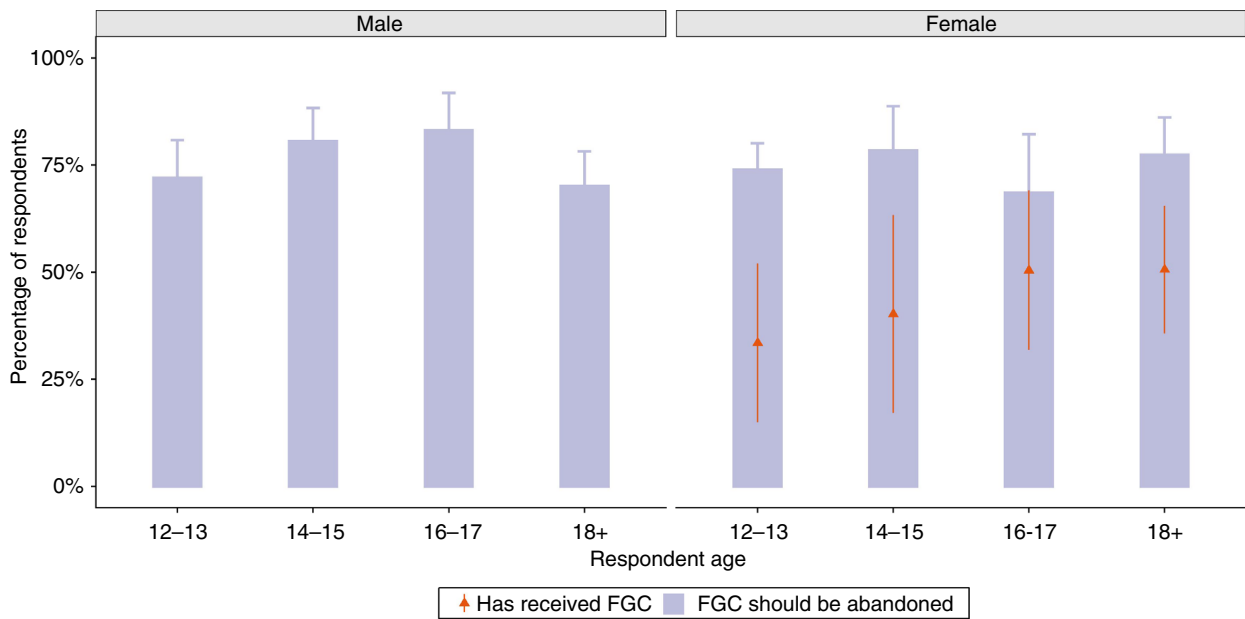


Figure 2 Prevalence of female genital cutting and support for abandoning female genital cutting by age and gender amongst adolescents in the Nouna Health and Demographic Surveillance System in Burkina Faso [Colour figure can be viewed at wileyonlinelibrary.com]

Table 3 Bivariate association of covariates with having received FGC and opposition to FGC

	FGC receipt (females only)		Opposition to FGC		
	%	OR [CI]	% All	OR [CI] Females	Males
Individual factors					
Age categories					
12–13	33.5%	1.00	73.1%	1.00	1.00
14–15	40.2%	1.34 [0.93–1.92]	79.4%	1.28 [0.77–2.12]	1.61 [0.74–3.49]
16–17	50.4%	2.02 [1.22–3.34]	75.1%	0.77 [0.47–1.24]	1.91 [1.18–3.10]
18+	50.6%	2.04 [1.13–3.68]	73.6%	1.21 [0.75–1.94]	0.91 [0.54–1.53]
Currently in school	39.3%	0.58 [0.34–0.99]	83.7%	3.04 [1.48–6.23]	2.17 [1.61–3.22]
Years of full-time education		0.96 [0.91–1.02]		1.15 [1.07–1.24]	1.09 [1.03–1.17]
Marital status					
Single	43.0%	1.00		1.00	1.00
Ever engaged/married	57.0%	1.99 [0.99–4.00]	64.0%	0.55 [0.35–0.88]	0.34 [0.08–1.50]
Religion					
Muslim	55.0%	1.00	84.8%	1.00	1.00
Catholic	18.4%	0.18 [0.05–0.63]	81.5%	1.84 [0.66–5.15]	1.62 [0.94–2.78]
Animist	48.3%	0.76 [0.08–6.89]	71.7%	10.0 [2.22–45.1]	0.93 [0.41–2.10]
Protestant	5.4%	0.05 [0.00–0.52]	84.2%	2.36 [1.12–4.95]	1.86 [0.71–4.89]
Ethnicity					
Dafin	57.8%	1.00	77.1%	1.00	1.00
Bwaba	2.5%	0.02 [0.01–0.06]	79.9%	1.40 [0.37–5.37]	0.98 [0.58–1.66]
Mossi	48.1%	0.68 [0.30–1.51]	72.7%	0.70 [0.22–2.26]	1.01 [0.66–1.56]
Peulh	54.5%	0.87 [0.31–2.42]	58.3%	0.53 [0.21–1.33]	0.32 [0.17–0.61]
Samo	60.5%	1.12 [0.56–2.25]	81.4%	0.66 [0.26–1.66]	1.13 [0.58–2.17]
Other	30.7%	0.32 [0.17–0.61]	79.0%	2.36 [1.40–3.96]	**
FGC status					
Uncut			82.8%	1.00	
Cut			65.4%	0.39 [0.20–0.77]	
Cutting required by religion					
No/no religion	39.1%	1.00	90.3%	1.00	1.00
Yes	72.0%	4.24 [2.05–8.76]	55.3%	0.16 [0.08–0.33]	0.10 [0.6–0.18]
Don't know	37.5%	1.20 [0.52–2.78]	49.3%	0.19 [0.09–0.41]	0.04 [0.02–0.10]
Age at cutting					
Media exposure		1.28 [1.06–1.55]		1.13 [0.89–1.44]	1.08 [0.98–1.18]
Household factors					
Wealth					
Lowest quintile	34.7%	1.00	68.4%	1.00	1.00
Second quintile	32.2%	0.89 [0.56–1.42]	74.0%	1.35 [0.82–2.22]	1.30 [0.91–1.86]
Third quintile	46.8%	1.66 [0.76–3.63]	75.4%	1.19 [0.55–2.55]	1.76 [1.13–2.75]
Fourth quintile	44.4%	1.50 [0.52–4.39]	79.1%	1.70 [1.15–2.50]	1.84 [1.30–2.61]
Highest quintile	57.2%	2.51 [0.93–6.78]	79.4%	1.97 [0.96–4.04]	1.61 [0.91–2.84]
Father's education					
None	47.4%	1.00	73.8%	1.00	1.00
Primary	27.1%	0.41 [0.19–1.09]	83.1%	1.59 [0.64–3.98]	1.96 [1.03–3.71]
Post-primary or higher	34.1%	0.58 [0.09–0.58]	77.7%	1.02 [0.48–2.20]	1.55 [0.51–4.67]
No Father	52.6%	1.23 [0.54–2.83]	74.8%	0.99 [0.60–1.63]	1.14 [0.48–2.74]
Mother's education					
None	45.8%	1.00	74.2%	1.00	1.00
Primary	27.6%	0.45 [0.19–1.09]	85.5%	0.34 [0.11–1.08]	1.62 [0.63–3.85]
Post-primary or higher	16.2%	0.23 [0.09–0.58]	75.6%	1.05 [0.44–2.52]	1.14 [0.61–2.11]
No mother	48.9%	1.13 [0.50–2.55]	70.4%	0.83 [0.38–1.81]	0.68 [0.15–2.96]
Community factors					
% muslims in village		1.24 [1.01–1.51]		0.90 [0.77–1.06]	0.95 [0.88–1.02]

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	FGC receipt (females only)		Opposition to FGC		
	%	OR [CI]	% All	OR [CI] Females Males	
Village FGC rate		1.74 [1.52–2.00]		0.99 [0.82–1.18]	0.99 [0.87–1.11]
Residence					
Urban	51.4%	1.00	75.9%	1.00	1.00
Rural	39.7%	0.62 [0.23–1.70]	75.0%	0.92 [0.50–1.69]	1.00 [0.68–1.45]
BIDR score					
Lowest quintile	42.2%	1.00	71.0%	1.00	1.00
Second quintile	28.9%	0.55 [0.33–0.94]	78.2%	3.30 [2.00–5.43]	1.13 [0.48–2.63]
Third quintile	49.2%	1.32 [0.56–3.13]	72.5%	1.00 [0.47–2.11]	0.84 [0.25–2.87]
Fourth quintile	44.4%	1.09 [0.42–2.81]	77.4%	1.64 [1.04–2.59]	0.99 [0.35–2.78]
Highest quintile	49.9%	1.36 [0.55–3.36]	77.1%	1.23 [0.58–2.64]	0.68 [0.27–1.72]

Bivariate logistic regression models, adjusted for survey weights. BIDR: Balanced Inventory of Desirable Reporting, CI: confidence interval, FGC: female genital cutting, OR: odds ratio. *not applicable ** predicts success perfectly and therefore dropped.

Discussion

The latest national data on FGC prevalence in Burkina Faso include respondents born between 1961 and 1995, who report on the FGC status of their daughters born between 1996 and 2010 [44]. In this study, we provide self-reported FGC data on birth cohorts from 1997 to 2005 for one rural area in north-western Burkina Faso. Self-reported FGC prevalence in our sample was 43%, lower than the previous national self-reported prevalence of 59% for the 1990–1995 cohorts but higher than the mother-reported 25% for the 1996–2000 cohorts. Among those of our respondents who had been cut, 54% reported having been cut before age five, a value that again falls between the estimates based on the 1990–1995 (64%) and 1996–2000 (30%) cohorts. While the methods differ, these findings suggest that FGC prevalence in the Nouna HDSS site may be above the national average and still substantial, even though our respondents were born after FGC became illegal.

Reported support for FGC in Burkina Faso has been low for decades, reflecting political will, law enforcement, community education programs, media campaigns and implementation of support services [47,48]. While 90% of women in the latest nationally representative Demographic and Health Surveys (2010) stated that the practice should stop [44], in our young, rural population, only 75% of respondents supported abandoning FGC. Whether such levels of opposition are sufficient to end FGC will likely depend on whether behaviours are driven by individual beliefs or social conventions.

In our analysis, community-level conventions appeared important for FGC receipt, with almost half of FGC receipt variance occurring between communities. Furthermore, the most important predictor of FGC receipt was community-level FGC prevalence. Attitudes towards abandoning FGC were less patterned by communities. Nevertheless, community FGC prevalence significantly predicted female (but not male) adolescent attitudes towards FGC and one's own FGC status strongly predicted attitudes about FGC: even after adjusting for community-level FGC prevalence, cut women had one-third the odds of wanting to abandon FGC of their uncut peers.

Social conventions can also act through other identities, such as religion and ethnicity. It is difficult to separate out these variables in our data: six of 10 villages had over 90% of residents from one ethnicity, and five had over 89% from one religion. However, both religion and ethnicity independently predicted both FGC receipt and attitudes, although attitudes were less strongly associated with communities themselves. Both Muslim faith and belief that FGC is a religious requirement were independent predictors of not wishing to abandon FGC. However, 12% of respondents were unsure whether FGC was required by religion, potentially leaving room for attitudes and behaviour to change.

Evidence that modernisation has affected FGC dynamics in our setting was limited. Although respondents with better-educated parents were less likely to be cut, the low prevalence of parental, especially maternal, education limits its impact at present. The potential future impact of education is however promising: both current school

Table 4 Multivariable regression models of FGC receipt

	Model 1: individual characteristics	Model 2: plus household characteristics	Model 3: plus community characteristics
Age			
12–13 years	1.00	1.00	1.00
14–15 years	1.47 [0.82–2.62]	1.38 [0.77–2.49]	1.33 [0.75–2.38]
16–17 years	1.97 [0.86–4.47]	1.83 [0.72–4.67]	1.77 [0.73–4.31]
18+ years	1.57 [0.77–3.19]	1.38 [0.64–2.98]	1.37 [0.66–2.83]
Currently in school	0.59 [0.29–1.22]	0.57 [0.29–1.16]	0.57 [0.28–1.15]
Years of full-time education	0.98 [0.90–1.06]	0.99 [0.91–1.08]	1.00 [0.91–1.09]
Marital status			
Ever unioned vs single	1.29 [0.69–2.41]	1.28 [0.70–2.32]	1.24 [0.70–2.22]
Religion			
Muslim	1.00	1.00	1.00
Catholic	0.74 [0.54–1.02]	0.83 [0.51–1.32]	0.88 [0.55–1.41]
Animist	1.01 [0.63–1.62]	1.08 [0.56–2.08]	1.15 [0.69–1.90]
Protestant	0.16 [0.04–0.62]	0.16 [0.05–0.57]	0.18 [0.05–0.63]
Ethnicity			
Dafin	1.00	1.00	1.00
Bwaba	0.02 [0.00–0.11]	0.02 [0.00–0.10]	0.28 [0.04–1.88]
Mossi	0.98 [0.66–1.46]	0.91 [0.60–1.37]	1.03 [0.81–1.33]
Peulh	0.96 [0.50–1.87]	1.03 [0.48–2.22]	0.94 [0.57–1.57]
Samo	1.41 [0.91–2.20]	1.37 [0.86–2.18]	1.27 [0.96–1.68]
Other	0.41 [0.32–0.52]	0.48 [0.35–0.67]	0.50 [0.37–0.68]
Mother's education			
None		1.00	1.00
Primary		0.70 [0.33–1.46]	0.67 [0.32–1.37]
Post-primary or higher		0.17 [0.07–0.43]	0.17 [0.07–0.41]
Not applicable		1.46 [0.69–3.09]	1.47 [0.63–3.40]
Father's education			
None		1.00	1.00
Primary		0.77 [0.36–1.67]	0.77 [0.36–1.68]
Post-primary or higher		0.74 [0.41–1.33]	0.77 [0.42–1.39]
Not applicable		1.28 [0.58–2.83]	1.38 [0.61–3.10]
Wealth			
Lowest Quintile		1.00	1.00
Second Quintile		0.60 [0.28–1.31]	0.58 [0.26–1.30]
Third Quintile		0.97 [0.63–1.49]	0.95 [0.63–1.50]
Fourth Quintile		0.79 [0.39–1.58]	0.78 [0.38–1.58]
Highest Quintile		1.74 [0.96–3.16]	1.66 [0.90–3.08]
Rural vs Urban residence			0.83 [0.63–1.11]
Community FGC Rate			1.63 [1.40–1.90]
ICC	0.11	0.12	<0.001
AIC	886.7	857.7	840.2

2-level hierarchical model with random effects at village level. CI: confidence interval, FGC = female genital cutting, OR: odds ratio. N = 689 for all models, 1 respondent was dropped because of missing covariate values.

enrolment and total years of education were bivariate associated with believing that FGC should be abandoned, and the former remained a strong predictor of abandonment in multivariable analysis for both male and

female adolescents. Despite substantial anti-FGC media messaging in Burkina Faso, media exposure was only weakly associated with FGC attitudes. The adjusted association between household wealth and FGC

A. Greis *et al.* Female genital cutting in Burkina Faso**Table 5** Multivariable regression models of thinking FGC should be abandoned

	Model 1: individual characteristics	Model 2: add household characteristics	Model 3: add community characteristics	Model 3a: females only†	Model 3b: males only‡
Male vs female	0.79 [0.51–1.21]	0.80 [0.53–1.21]	0.80 [0.53–1.21]		
Age					
12–13 years	1.00	1.00	1.00	1.00	
14–15 years	1.49 [1.07–2.07]	1.52 [1.07–2.16]	1.52 [1.08–2.14]	1.43 [0.71–2.89]	1.88 [0.91–3.91]
16–17 years	1.30 [0.80–2.11]	1.31 [0.81–2.13]	1.31 [0.81–2.13]	0.84 [0.40–1.76]	2.20 [0.96–5.03]
18+ years	1.42 [0.93–2.18]	1.45 [0.97–2.19]	1.46 [0.98–2.17]	1.94 [1.08–3.50]	1.20 [0.77–1.86]
Currently in school	1.99 [1.34–2.94]	1.96 [1.31–2.94]	1.97 [1.33–2.92]	1.97 [1.27–3.05]	2.21 [1.14–4.27]
Years of education	1.01 [0.95–1.06]	1.00 [0.94–1.06]	1.00 [0.94–1.07]	1.03 [0.94–1.14]	0.97 [0.90–1.05]
FGC received				0.38 [0.23–0.63]	*
Ever unioned vs. single	0.69 [0.38–1.28]	0.72 [0.34–1.50]	0.72 [0.34–1.51]	0.58 [0.24–1.43]	0.36 [0.12–1.10]
Media exposure	1.11 [0.92–1.35]	1.07 [0.87–1.32]	1.07 [0.87–1.32]	1.14 [0.83–1.57]	1.11 [0.99–1.24]
FGC required by religion					
No	1.00	1.00	1.00	1.00	1.00
Yes	0.13 [0.08–0.21]	0.13 [0.08–0.21]	0.13 [0.08–0.21]	0.20 [0.10–0.42]	0.09 [0.06–0.13]
Don't know	0.12 [0.07–0.23]	0.12 [0.07–0.23]	0.12 [0.07–0.23]	0.21 [0.11–0.42]	0.04 [0.02–0.12]
Religion					
Muslim	1.00	1.00	1.00	1.00	1.00
Catholic	1.18 [0.67–2.09]	1.19 [0.67–2.10]	1.18 [0.67–2.08]	0.91 [0.31–2.69]	1.61 [0.85–3.08]
Animist	1.65 [0.37–7.38]	1.76 [0.40–7.70]	1.75 [0.36–8.50]	6.87 [0.66–72.1]	0.70 [0.19–2.54]
Protestant	1.67 [0.71–3.92]	1.72 [0.71–4.16]	1.70 [0.70–4.12]	1.05 [0.28–3.94]	2.36 [0.94–5.93]
Ethnicity					
Dafin	1.00	1.00	1.00	1.00	1.00
Bwaba	0.61 [0.31–1.20]	0.65 [0.33–1.28]	0.62 [0.35–1.07]	1.49 [0.37–6.04]	0.30 [0.14–0.68]
Mossi	0.55 [0.30–1.02]	0.54 [0.28–1.04]	0.54 [0.29–1.02]	0.64 [0.40–1.04]	0.56 [0.27–1.16]
Peulh	0.62 [0.43–0.89]	0.66 [0.45–0.96]	0.66 [0.47–0.92]	1.08 [0.60–1.96]	0.40 [0.17–0.94]
Samo	0.99 [0.59–1.65]	0.94 [0.55–1.63]	0.95 [0.55–1.65]	1.33 [0.67–2.65]	0.80 [0.30–2.15]
Other	0.72 [0.51–1.01]	0.70 [0.47–1.05]	0.72 [0.51–1.03]	0.41 [0.24–0.69]	**
Mother's education					
None		1.00	1.00	1.00	1.00
Primary		1.61 [0.94–2.76]	1.61 [0.93–2.77]	1.90 [1.04–3.48]	1.26 [0.63–2.52]
Post-primary/ higher		0.58 [0.25–1.33]	0.58 [0.25–1.33]	0.30 [0.09–1.01]	1.10 [0.62–1.92]
Not applicable		0.99 [0.58–1.68]	0.98 [0.56–1.71]	1.13 [0.69–1.85]	1.11 [0.27–4.56]
Living with mother		1.10 [0.82–1.47]	1.10 [0.83–1.47]	0.86 [0.48–1.54]	1.75 [1.25–2.45]
Wealth					
Lowest Quintile		1.00	1.00	1.00	1.00
Second Quintile		1.61 [1.06–2.45]	1.61 [1.06–2.45]	1.48 [0.82–2.68]	1.92 [1.09–3.38]
Third Quintile		1.42 [0.92–2.19]	1.42 [0.93–2.18]	1.25 [0.53–2.94]	1.91 [0.96–3.80]
Fourth Quintile		1.62 [1.00–2.62]	1.63 [0.99–2.67]	2.22 [1.10–4.46]	1.33 [0.81–2.18]
Highest Quintile		1.70 [1.12–2.60]	1.74 [1.10–2.73]	2.80 [0.93–8.47]	1.33 [0.47–3.73]
Rural vs urban residence			1.06 [0.80–1.39]	1.41 [0.94–2.13]	0.96 [0.59–1.55]
FGC rate			0.99 [0.87–1.13]	1.20 [1.00–1.44]	0.93 [0.82–1.06]
ICC	<0.001	<0.001	<0.001	<0.001	<0.001
AIC	1238.4	1227.0	1226.9	655.5	521.0

2-level hierarchical model with random effects at village level. OR: odds ratio, CI: confidence interval, FGC = female genital cutting. N = 1335 for both gender models, 3 respondents were dropped because of missing values. *not applicable. †N = 598; 2 participants dropped due to missing covariate values. ‡N = 736, 4 respondents dropped due to missing covariate values. **Category (and 9 respondents) dropped because all those with 'other' ethnicity had the same outcome.

abandonment was also inconclusive. These non-associations run counter to much existing FGC literature; however, they may reflect limited variation in socioeconomic status within the HDSS, or the wealth index's limited ability to capture non-market economies [31,53]. Overall, our results suggest that to date modernisation may be too limited in this setting to have had a chance to affect FGC attitudes and behaviours.

Since FGC is a behaviour practised among women [18], women's attitudes are most likely to predict future practice. In our sample, it was unclear if social conventions greatly affected female adolescents' FGC attitudes: community-level variation in FGC attitudes was greater for female adolescents (16%) than for male adolescents (4%), but religious affiliation did not strongly predict female adolescents' attitudes. Furthermore, although lower community FGC prevalence was associated with preference for FGC abandonment in multivariable models, this was only seen after accounting for the strong impact of one's own FGC status on abandonment attitudes. On the other hand, female adolescents in wealthier households favoured abandoning FGC more strongly than male adolescents, and maternal education also appeared to have a stronger impact on women. In combination, these results suggest that changing male adolescent FGC attitudes may require efforts at changing social conventions, while modernisation may have more impact on female adolescents – not least by empowering them to make independent decisions.

Burkina Faso's National Action Plan for the fight against FGC expires in 2020, and funding for anti-FGC activities is unstable [46]. Past efforts have not ended FGC and it remains unclear how members of FGC-practising communities can be persuaded to cease cutting – most FGC literature documents prevalence and medical implications, rather than pinpointing how FGC attitudes form and what drives change [54]. This study cannot provide concrete answers, but it does raise some important areas for future research. First, our finding that social conventions are stronger predictors than modernisation factors of FGC status in a setting with limited modernisation is consistent with a dynamic explanation of FGC persistence that combines elements from both frameworks [33]. Longitudinal analysis can help determine if the relative importance of social convention and modernisation factors changes as modernisation progresses. Second, our findings regarding gender differences in the relative importance of modernisation should be evaluated in more depth and in different locations. Third, the substantial gap between abandonment attitudes and prevalence highlight that believing FGC should be abandoned may be insufficient: the key question is how

attitudes translate into future decisions regarding daughters. Following adolescents as they become parents will allow us to see how their attitudes link to FGC outcomes.

Strengths and limitations

One strength of our study was that we interviewed adolescents directly about their FGC experiences and attitudes, instead of asking mothers. This approach should reduce underreporting due to either social desirability bias or fear of prosecution. Nevertheless, female adolescents may underreport their own FGC status, as often happens with sexual health data [55]. Underreporting may occur because respondents are unaware of having been cut (due to limited education or young age at cutting), have already internalised their elders' attitudes, or fear stigma. Reassuringly, we found no association between higher social desirability scores and FGC receipt or attitudes in our study, suggesting limited misreporting because of social pressures. Our findings probably cannot be generalised directly beyond rural, low-education settings, perhaps not even beyond Burkina Faso. Nevertheless, our conclusions may well be applicable to other settings where modernisation has yet to take hold. Finally, the cross-sectional nature of this study provides a (limited) view into the dynamics behind FGC, especially attitude formation. In addition, the questionnaire used for data collection was not locally validated, but most questions were based on an extensively validated and widely used instrument [49]. Lastly, the inclusion of qualitative measures may have enhanced our understanding of FGC attitudes but was not feasible in this study.

Conclusion

Despite FGC having been illegal for over 20 years, we found that FGC continues to be common among adolescents in rural Burkina Faso, with 25% not favouring abandoning the practice. Social conventions appear to play an important role in continuing FGC, due to community, religious and ethnic affiliations. Modernisation does not appear to have had an impact yet in this area – potentially due to limited economic development. Despite conventions predicting FGC prevalence and attitudes, legal and non-governmental efforts in this part of Burkina Faso do not appear to have been as effective as social convention theory proposes. Careful study incorporating mixed-method approaches is required to determine how FGC attitude change can be encouraged, and how changes in attitudes do or do not lead to FGC elimination in communities.

Acknowledgements

We acknowledge the contribution of the data collectors and supervisors in enabling the analysis of these data. Funding for the Nouna ARISE study was provided by the Alexander von Humboldt Foundation through an Alexander von Humboldt University Professor award to Till Bärnighausen, which is funded by the German Federal Ministry of Education and Research. Funding for the ARISE Adolescent Health Study was provided by the Department of Global Health and Population at Harvard T.H. Chan School of Public Health. Guy Harling was supported by a fellowship from the Wellcome Trust and Royal Society (210479/Z/18/Z).

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