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# Prevalence and factors associated with female genital mutilation among women of reproductive age in the Bawku municipality and Pusiga District of northern Ghana

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## Abstract

**Background:** Globally, three million girls are at risk of female genital mutilation (FGM) and an estimated 200 million girls and women in the world have undergone FGM. While the overall prevalence of FGM in Ghana is 4%, studies have shown that the overall prevalence in the Upper East Region is 38%, with Bawku municipality recording the highest at 82%.

**Methods:** This study used a cross-sectional design with a quantitative approach: a survey with women of reproductive age (15–49).

**Results:** Among all respondents, 830 women who participated in the study, 61% reported having undergone FGM. Of those circumcised, 66% indicated their mothers influenced it. Three quarters of the women think FGM could be stopped through health education. Women who live in the Pusiga district (AOR: 1.66; 95% CI: 1.16–2.38), are aged 35–49 (AOR: 4.24; 95% CI: 2.62–6.85), and have no formal education (AOR: 2.78; 95% CI: 1.43–5.43) or primary education (AOR: 2.10; 95% CI: 1.03–4.31) were more likely to be circumcised relative to those who reside in Bawku Municipal, are aged 15–24, and had tertiary education. Likewise, married women (AOR: 3.82; 95% CI: 2.53–5.76) were more likely to have been circumcised compared with unmarried women. At a site-specific level, factors associated with FGM included age and marital status in Bawku, and age, marital status, and women's education in Pusiga.

**Conclusion:** Female Genital Mutilation is still being practiced in the Bawku Municipality and the Pusiga District of northern Ghana, particularly among women with low socio-economic status. Implementing interventions that would provide health education to communities and promote girl-child education beyond the primary level could help end the practice.

**Keywords:** Female genital mutilation, Female genital cutting, Prevalence, Factors, Ghana

## Background

Female genital mutilation (FGM), also known as female circumcision or female genital cutting, is defined as the partial or total removal of external female genitalia and injury to the female organs for cultural or other non-therapeutic reason [1]. FGM is performed in various forms in 28 African countries, and the social drivers

behind the practice are multifaceted. Globally, three million girls are at risk of genital mutilation, [2] and an estimated 200 million girls and women in the world have undergone FGM [1].

Although the overall prevalence of FGM in Ghana is 4% [3], studies have shown that the prevalence varies by region and is widespread in northern Ghana [4–6]. In the Upper East region, clinical research revealed an overall prevalence of 38%, with Bawku municipality recording the highest at 82% [7]. It is hypothesized that the higher prevalence of FGM in Northern Ghana

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resulted from the mixture of the people and culture of Northern Ghana with those of the neighboring countries of Mali, Togo and Burkina Faso, where the practice is more common.

Women and girls who have undergone FGM are at risk of both short- and long-term consequences. The short-term risks of FGM include severe pain, excessive bleeding, shock, genital tissue swelling, heightened risk of human immunodeficiency virus (HIV) after using the same knife to cut women/girls [8], impaired wound healing, psychological consequences, and even death. Long-term consequences of the practice include infections, such as chronic genital, reproductive tract, and urinary tract infections, and pain, including painful urination, painful intercourse and menstrual problems [8, 9]. Other risks of FGM include keloids, obstetric complications, perinatal risks, reduction of sexual quality, dyspareunia, and psychological consequences among other things [2, 10–12].

Several studies have examined factors that influence the practice of FGM. Some have highlighted important relationships between demographic factors such as age, education and religion [12–15]. Studies in sub-Saharan African countries suggest a relationship between economic factors and female circumcision [13, 14]. Women with better financial resources or household affluence were less likely to be circumcised [13–15], being younger and better educated has been shown to be protective of FGM [13–16].

Cultural and religious factors have been found to influence the practice of FGM [13, 16–20]. Cultures that put a high premium on preservation of virginity, reducing premarital sex and early pregnancy, and minimizing the risk of extramarital affairs have been shown to be more likely to encourage FGM [16, 21, 22].

### Justification

Many women have undergone female genital mutilation in Ghana and many more women and girls are at risk of undergoing female genital mutilation every year. The majority of girls are cut before they turn 15 years old. In 1994, the Ghanaian government outlawed female circumcision. According to this law, circumcisers can be sentenced to up to 3 years of imprisonment (Criminal code Amendment Bill; Ghana, 1994) [23]. However, this traditional practice is still going on among some predominant ethnic groups of the Upper East region in spite of the 1994 legislation against it.

Moreover, clinical studies have revealed that FGM is detrimental to reproductive health [5, 24–30], but the practice is reported to be sustained by traditional and social values [4, 31] that need to be understood and addressed by intervention programs.

The aim of the study was to determine circumcision status of women of reproductive age and factors associated with it in the Bawku Municipality and Pusiga District of northern Ghana.

## Methods

### Study design and methods and setting

This study used a cross-sectional design with a quantitative approach: a survey of women of reproductive age (15–49 years) to determine the prevalence and determinants of FGM.

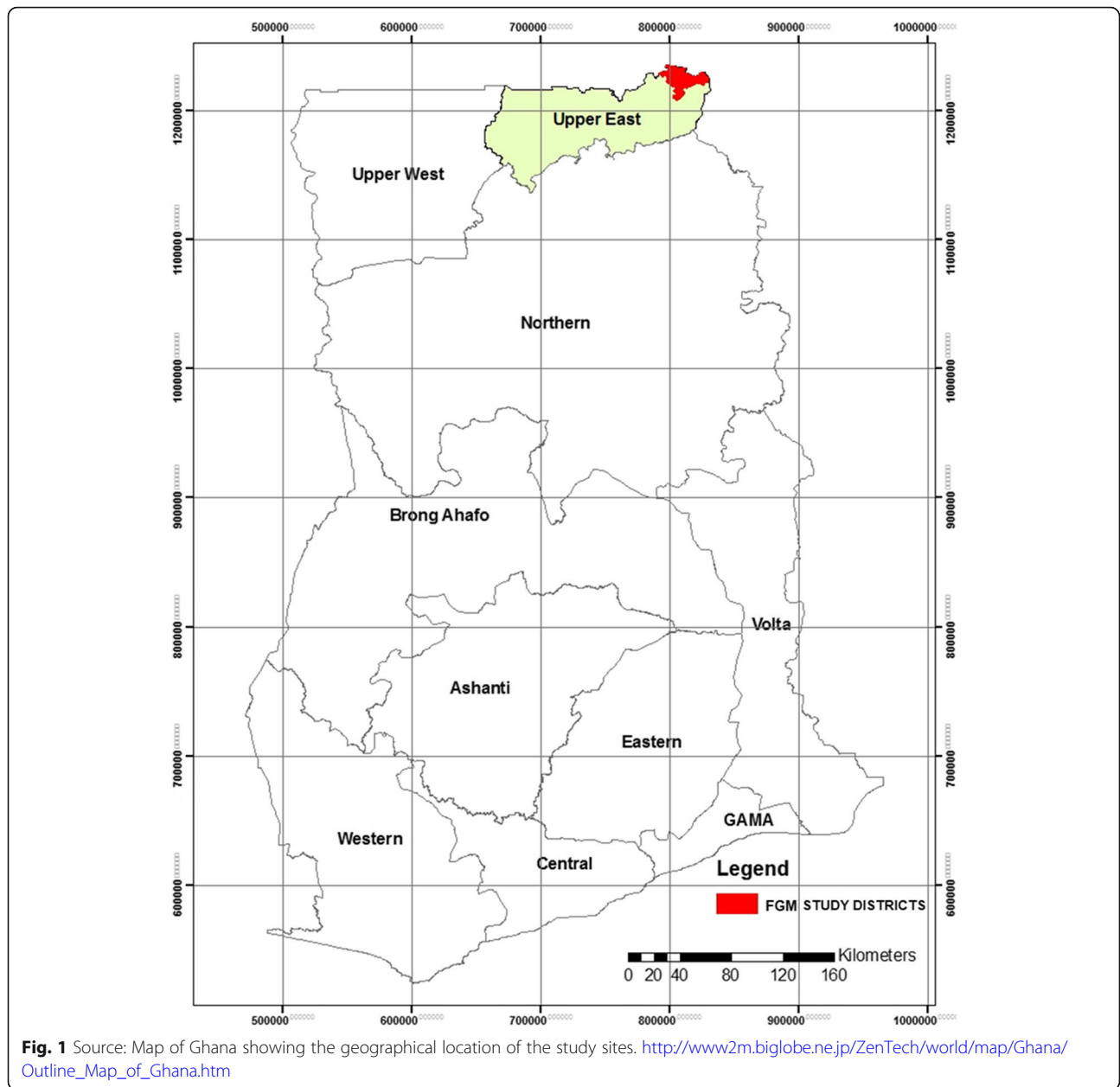
The study was conducted in the Bawku Municipal and Pusiga District. Bawku is one of the thirteen [12] districts and municipalities in the Upper East Region of Ghana. It shares boundaries with Burkina Faso, the Republic of Togo, Bawku West District and Garu-Tempane District to the north, east, west and the south respectively. The administrative capital is Bawku. The population of the district according to 2010 Population and Housing Census stands at 98,538 with 47,254 males and 51,284 females [32].

Pusiga District with its administrative capital Pusiga is one of the 13 administrative and political districts in the Upper East Region of Ghana and was carved from Bawku Municipal in 2012. Pusiga shares boundaries with Burkina Faso to the North, Republic of Togo to the East, Bawku West to the West and Bawku Municipal to the South. The population of the district according to 2010 Population and Housing Census stands at 57,677 [32] (Fig. 1).

### Sampling and participant criteria

The sample size was calculated based on the population of women aged 15 and 49 years (Bawku = 24,494, Pusiga 15,040, total population = 43,038) and an average estimated proportion of FGM (50%) in the Bawku Municipality and Pusiga District with a 95% confidence interval as well as a corresponding  $p < 0.05$  for significance. We used the formula for sample size  $n = \{2(Z_{\alpha} + Z_{1-\beta})^{2\sigma^2} / \Delta^2\}$  [33] and this gave a sample size of 379 women in Bawku Municipality and 375 women in Pusiga District. We assumed a refusal rate of 10%, meaning one would need to interview approximately 417 women in the Bawku Municipality and 415 women in the Pusiga District. The total sample size for the two districts was 832 women.

A two-stage sampling method was used and the primary sampling unit is the community. The first stage involved selecting 8 communities in the Bawku Municipality and Pusiga District. In the second stage, a random direction from the center of the community was selected, by spinning a pen. The houses along that direction were counted out to the boundary of the community, and one selected at random was the first household surveyed. Proximity selection was used to select subsequent households as the



**Fig. 1** Source: Map of Ghana showing the geographical location of the study sites. [http://www2m.biglobe.ne.jp/ZenTech/world/map/Ghana/Outline\\_Map\\_of\\_Ghana.htm](http://www2m.biglobe.ne.jp/ZenTech/world/map/Ghana/Outline_Map_of_Ghana.htm)

“next nearest” until the desired sample size was reached. We repeated that in all the selected communities until we attained the number of respondents required. The selection of the number of households to be interviewed in each community was based on the size of the population of the community. We interviewed one woman within the reproductive age (15–49 years) in each household. Where there was more than one eligible respondent, we randomly selected and interviewed one person. For the random selection process, each eligible member of the household was assigned a unique number, then each number placed in a bowl and mixed thoroughly. The fieldworker then randomly picked numbered tags from the

bowl and interviewed the selected women. We included 830 women in the analysis and excluded two because of missing key background information. The inclusion criteria of participants was all women of reproductive age (15–49 years old) who reside in the selected communities of the two study sites.

We collected the data using a structured questionnaire that included variables about social and demographic characteristics such as age, education, religion, father’s religion, mother’s religion, marital status, ethnicity, geographical location (i.e. Bawku and Pusiga), and household assets. These independent variables were collected based on previous studies [12–16, 34, 35]. We generated

**Table 1** Socio-demographic characteristics of respondents

Characteristics	Bawku Municipal (n = 415) N (%)		Pusiga District (n = 415) N (%)		Both Districts (n = 830) N (%)	
Age group						
15–24	158	38.07	139	33.49	297	35.78
25–34	126	30.36	136	32.77	262	31.57
35–49	131	31.57	140	33.74	271	32.65
Religion						
Traditional	3	0.72	1	0.24	4	0.48
Christianity	37	8.92	55	13.25	92	11.08
Islam	375	90.36	359	86.51	734	88.44
Father's Religion						
Traditional	30	7.23	40	9.64	70	8.43
Christianity	21	5.06	61	14.70	82	9.88
Islam	364	87.71	314	75.66	678	81.69
Mother's Religion						
Traditional	21	5.06	26	6.26	47	5.66
Christianity	36	8.67	72	17.35	108	13.01
Islam	358	86.27	327	76.39	675	81.33
Ethnicity						
Kusassi	80	19.28	97	23.37	177	21.33
Mamprusi	5	1.20	6	1.45	11	1.33
Busanga	302	72.73	204	49.16	506	60.96
Moshie	25	6.02	44	10.60	69	8.31
Hausa	1	0.24	10	2.41	11	1.33
Other	4	0.48	54	13.01	56	6.74
Marital status						
Married	285	68.67	298	71.81	583	70.24
Single/widowed/separated	130	31.33	117	28.19	247	29.76
Education						
None	246	59.28	225	54.22	471	56.75
Primary	57	13.73	83	20.00	140	16.87
Middle/JSS/JHS	90	21.69	65	15.66	155	18.67
Secondary/SSS/SHS +	22	5.30	42	10.12	65	7.71
Wealth Index						
Poor	104	25.62	169	41.01	273	33.37
Middle	135	33.25	138	33.50	273	33.37
vRich	167	41.13	105	25.49	272	33.26
Circumcision Status						
Yes	236	56.87	273	65.78	509	61.33
No	179	43.13	142	34.22	321	38.67
Most Important Reason for Practice						
It's necessary puberty rites	9	2.17	9	2.17	18	2.17
Control sexual desire	145	34.94	96	23.13	241	29.04
Continue a tradition	137	33.01	227	54.70	364	43.86
For social acceptance	100	24.10	65	15.66	165	19.88

**Table 1** Socio-demographic characteristics of respondents (Continued)

Characteristics	Bawku Municipal (n = 415) N (%)		Pusiga District (n = 415) N (%)		Both Districts (n = 830) N (%)	
Other	24	5.78	18	4.34	42	5.05
How to Stop FGM						
Education	312	75.19	318	76.63	630	75.90
Prosecute practitioners	97	23.37	90	21.69	187	22.53
Alternative puberty rites	4	0.96	4	0.96	8	0.97
Other	2	0.48	3	0.72	5	0.60

a quintile rank for wealth, based on possession of 23 items representing household assets.

The questionnaire was developed in the English language and pre-tested outside the study communities in order to improve the relevance and appropriateness of the questions. The pretest offered the fieldworkers the opportunity to practice the interviewing techniques, and the questionnaire was revised appropriately after the exercise. The fieldworkers underwent 2 weeks of training prior to the survey and visited households to interview eligible women.

**Data analysis**

We produced descriptive statistics to summarize respondents' background characteristics. Multivariable logistic regression analysis was performed to identify factors associated with circumcision status among women of reproductive age in the two study sites. We determined whether the respondents had been circumcised by asking the question, "Are you circumcised"? The following explanatory variables were analyzed: geographical location, age, marital status, educational level, religion, ethnicity, wealth index, father's education and mother's education. The wealth index consisted of 23 household-related items. We generated quintile ranks for wealth status using principal component analysis. All *P* values were two-tailed, and the significance level was set at *p* < 0.05. We performed all statistical analyses using Stata Version 12 (Stata Corp., TX).

**Results**

**Respondents' socio-demographic characteristics**

Table 1 shows the characteristics of the 830 participants from the two sites included in the study. The number of respondents from each of the district is about the same – 417 in the Bawku Municipality and 413 in Pusiga. Approximately 57% of the women had received no education. Sixty seven percent of the women were aged 15 to 34 years. The majority (82%) of the women were Moslems and 8% identified themselves with the Christian faith.

In addition, 61% of them were of the Busanga tribe and 70% were married. In all, 61% of women reported having undergone FGM and of those circumcised, 66%

indicated their mothers influenced it. And the most important reasons for the practice included to continue a tradition (44%), control sexual desire (29%), and for social acceptance (20%). About three quarters of the women think FGM could be stopped through health education.

**Factors associated with circumcision status across study sites**

Table 2 presents the results of a regression analysis for circumcision status by selected characteristics across the two sites. The results revealed that women who reside in the Pusiga district (adjusted odds ratios [AOR]: 1.66; 95% CI: 1.16–2.38), are aged 35–49 (AOR: 4.24; 95% CI: 2.62–6.85), and have no education or primary education (AOR: 2.78; 95% CI: 1.43–5.43) (AOR: 2.10; 95% CI: 1.03–4.31) were more likely to circumcise relative to those who reside in the Bawku Municipal, are aged 15–24 and had tertiary education respectively. Also, married women (AOR: 3.82; 95% CI: 2.53–5.76) were more likely to have been circumcised compared with the unmarried (i.e. single, divorced, or widowed).

**Factors associated with circumcision status at each study site**

Table 3 presents the results of the regression analysis for circumcision status according to selected characteristics, in the Bawku Municipal. The results revealed that, women aged 35–49 (AOR: 5.05; 95% CI: 2.48–10.30) and were married (AOR: 4.83; 95% CI: 2.61–8.93) were more likely to circumcise relative to 15–24 years old and the unmarried respectively.

Table 4 presents the results of a regression analysis for circumcision status by selected characteristics across in the Pusiga District. The results revealed that, women aged 25–34 (AOR: 1.97; 95% CI: 1.08–3.59) and 35–49 (AOR: 4.27; 95% CI: 2.18–8.33), who had no education (AOR: 3.20; 95% CI: 1.40–7.31) and were married (AOR: 2.84; 95% CI: 1.59–5.10) were more likely to be circumcised compare with their counterparts, aged 15–24, unmarried and had tertiary education respectively.

**Table 2** Regression Analysis Results for Circumcision Status Across the two Study Districts

Characteristic	OR	(95% CI)	AOR	(95% CI)
<b>Geographical Location</b>				
Bawku (r)	<b>1</b>		<b>1</b>	
Pusiga	<b>1.46</b>	<b>1.10–1.93**</b>	<b>1.66</b>	<b>1.16–2.38**</b>
<b>Age-group</b>				
15–24 (r)	<b>1</b>		<b>1</b>	
25–34	<b>2.60</b>	<b>1.85–3.66***</b>	1.24	0.82–1.88
35–49	<b>9.84</b>	<b>6.50–14.91***</b>	<b>4.24</b>	<b>2.62–6.85***</b>
<b>Religion</b>				
Other religions (r)	<b>1</b>		<b>1</b>	
Islam	1.33	0.87–2.04	1.45	0.73–2.91
<b>Father's Religion</b>				
Other religions (r)	<b>1</b>		<b>1</b>	
Islam	<b>0.34</b>	<b>0.18–0.63***</b>	0.96	0.33–1.73
<b>Mother's Religion</b>				
Other religions (r)				
Islam	0.82	0.57–1.18	0.99	0.43–2.27
<b>Ethnicity</b>				
Kusassi (r)	<b>1</b>			
Busanga	1.09	0.77–1.55	1.16	0.73–1.83
Moshie	1.02	0.58–1.80	1.18	0.58–2.38
Other	0.85	0.49–1.45	0.77	0.39–1.54
<b>Woman's education</b>				
None	<b>6.81</b>	<b>3.85–12.02***</b>	<b>2.78</b>	<b>1.43–5.43**</b>
Primary	<b>3.40</b>	<b>1.81–6.37***</b>	<b>2.10</b>	<b>1.03–4.31*</b>
Middle/JHS	0.99	0.53–1.85	1.26	0.62–2.58
Secondary/SSS/SHS+ (r)	<b>1</b>		<b>1</b>	
<b>Marital Status</b>				
Divorced/widowed/never married (r)	<b>1</b>		<b>1</b>	
Married	<b>6.68</b>	<b>4.81–9.28***</b>	<b>3.82</b>	<b>2.53–5.76***</b>
<b>Wealth index</b>				
Poor (r)	<b>1</b>		<b>1</b>	
Middle	1.12	0.80–1.59	0.98	0.64–1.48
Rich	<b>1.42</b>	<b>1.01–2.01* 1.21</b>		0.80–1.85

Bold values are significant (\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ). AOR adjusted odds ratio, CI confidence interval, JHS junior high school, JSS junior secondary school, O.R odds ratio, SHS senior high school, SSS: senior secondary school

**Discussion**

The results revealed that 61% of women in the Bawku Municipality and the Pusiga District have been circumcised. Factors associated with FGM in the two sites included the woman age, marital status, women's education and geographical location. At a site-specific level, the following factors were associated with FGM: age and marital status in Bawku and age, marital status and women's education in Pusiga.

Geographical location played a significant role in women circumcision status: Women/girls in the Pusiga District had

a higher probability of being circumcised than their counterparts in the Bawku District. The reason could be that more women in Pusiga might have been crossing the border to neighboring Togo to circumcise since the practice is outlawed in Ghana [24]. Moreover, Bawku unlike Pusiga is a Municipality with more development programs [34, 36], making it more likely for women to receive health education and information on the harmful effects of the practice for informed decision making on whether or not to be circumcised. Besides, Bawku compared with Pusiga has achieved some improvement in



**Table 3** Regression Analysis Results for Circumcision Status in the Bawku Municipal

Characteristic	OR	(95% CI)	AOR	(95% CI)
Age group				
15–24 (r)	<b>1</b>		<b>1</b>	
25–34	<b>1.84</b>	<b>1.14–2.95**</b>	0.92	0.51–1.58
35–49	<b>10.8</b>	<b>5.98–19.6***</b>	<b>5.05</b>	<b>2.48–10.30***</b>
Religion				
Christianity (r)	<b>1</b>		<b>1</b>	
Islam	1.52	0.79–2.92	0.93	0.28–3.11
Father's Religion				
Other religion (r)	<b>1</b>		<b>1</b>	
Islam	0.48	0.21–1.12	2.02	0.45–9.05
Mother's Religion				
Christianity (r)	<b>1</b>		<b>1</b>	
Islam	0.12	0.64–1.97	0.63	0.15–2.72
Ethnicity				
Kusassi (r)	<b>1</b>		<b>1</b>	
Mamprusi	1.03	0.63–1.69	1.10	0.55–2.23
Busanga	0.99	0.40–2.46	1.11	0.36–3.42
Moshie	1.30	0.30–5.80	3.71	0.65–21.1
Woman's education				
None	<b>6.57</b>	<b>2.47–17.5***</b>	1.12	0.62–7.28
Primary	<b>3.18</b>	<b>1.09–9.30*</b>	1.97	0.52–7.34
Middle/JSS/JHS	0.97	0.34–2.77	0.95	0.26–3.53
Secondary/SSS/SHS+	<b>1</b>		<b>1</b>	
Marital Status				
Divorced/widowed/never married (r)	<b>1</b>		<b>1</b>	
Married	<b>7.71</b>	<b>4.80–12.4***</b>	<b>4.83</b>	<b>2.61–8.93***</b>
Wealth index				
Poor (r)	<b>1</b>		<b>1</b>	
Middle	1.03	0.62–1.71	0.97	0.51–1.81
Rich	1.60	0.98–2.65	1.78	0.96–3.29

Bold values are significant (\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ). AOR adjusted odds ratio, CI confidence interval, JHS junior high school, JSS junior secondary school, O.R odds ratio, SHS senior high school, SSS senior secondary school

post-secondary and tertiary education [34, 36] and that might have contributed to a reduction in FGM, as highly educated women are more likely to oppose the practice [17, 35, 37, 38]. Other studies also showed significant geographic variations of FGM within and across countries.

The results also revealed that women's age is a strong determinant of circumcision. The women aged 34–49 years old were more likely to be circumcised compared with their younger counterparts. The reason could be that in the past, almost all women in the Bawku Municipality and the Pusiga District embraced female circumcision, making it hard or impossible to come across a woman who had not undergone the practice [7]. However in recent times, FGM had slightly declined among the youth

possibly because of human rights and legal protection of women and girls against the practice [23]. FGM is now carried out in secrecy [39] in some communities or not at all in others because of the 1994 law that seeks to sentence any circumciser and other perpetrators up to 3 years imprisonment [23]. Such penalties could have contributed to the reduction in the number of circumcised women and girls yearly. These findings corroborate results by Setegn et al. [14], Bogale et al. [40] and Rahlenbeck and Mekonnen [41] that showed higher age categories were associated with increased odds of FGM among women.

Married women were more likely to have undergone FGM compared with their unmarried counterparts across

**Table 4** Regression Analysis Results for Circumcision Status in the Pusiga District

Characteristic	OR	(95% CI)	AOR	(95% CI)
Age group				
15–24 (r)	<b>1</b>		<b>1</b>	
25–34	<b>3.69</b>	<b>2.23–6.10***</b>	<b>1.97</b>	<b>1.08–3.59*</b>
35–49	<b>8.89</b>	<b>4.96–15.9***</b>	<b>4.27</b>	<b>2.18–8.33***</b>
Religion				
Other religions (r)	<b>1</b>		<b>1</b>	
Islam	1.29	0.72–2.30	1.74	0.72–4.18
Father's Religion				
Other religions (r)	<b>1</b>		<b>1</b>	
Islam	<b>0.24</b>	<b>0.09–0.66**</b>	0.51	0.18–1.42
Mother's Religion				
Other religions (r)	<b>1</b>		<b>1</b>	
Islam	0.71	0.43–1.17	1.20	0.42–3.38
Ethnicity				
Kusassi (r)	<b>1</b>		<b>1</b>	
Mamprusi	1.35	0.81–2.26	1.29	0.68–2.45
Busanga	0.99	0.47–2.07	1.21	0.48–3.04
Moshie	0.71	0.38–1.33	0.66	0.30–1.44
Woman's education				
None	<b>8.22</b>	<b>4.00–16.9***</b>	<b>3.20</b>	<b>1.40–7.31**</b>
Primary	<b>3.72</b>	<b>1.71–8.16***</b>	2.02	0.84–4.87
Middle/JSS/JHS	1.17	0.52–2.64	1.22	0.49–3.02
Secondary/SSS/SHS + (r)	<b>1</b>		<b>1</b>	
Marital Status				
Divorced/widowed/never married (r)	<b>1</b>		<b>1</b>	
Married	<b>5.82</b>	<b>3.66–9.25***</b>	<b>2.84</b>	<b>1.59–5.10***</b>
Wealth index				
Poor (r)	<b>1</b>		<b>1</b>	
Middle	1.37	0.85–2.20	1.09	0.61–1.93
Rich	1.46	0.87–2.45	0.84	0.45–1.55

Bold values are significant (\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ). AOR adjusted odds ratio, CI confidence interval, JHS junior high school, JSS junior secondary school, O.R odds ratio, SHS senior high school, SSS senior secondary school

the two study sites. Female genital mutilation is typically seen as a rite of passage into womanhood and a precursor to marriage [22, 42]. Once marriage is crucial to women/girls and FGM enhances their marriageability, they are forced to be mutilated [43]. The role of marriage in perpetuating the practice is understood in the following ways: FGM helps to preserve virginity, controls girls' and women sexuality [44–47] and is seen as a prerequisite for marriage [44, 45, 48–50]. Many studies have identified marriage as a factor associated with FGM [4, 46, 47, 51, 52].

We found that women with tertiary education were less likely to be circumcised compared with their counterparts with no education or primary education, particularly in the Pusiga district. Research has shown that educated

women are more likely to weigh the benefits over the risks before making decisions about their health [43]. A clear understanding of the benefits of not circumcising is likely to be attractive to women. In addition, when women are able to make autonomous decisions, they are able to take actions that will favor them [53–55]. Some studies report that educated women wield economic power and thus have the authority to make independent decisions about FGM [3, 35, 56, 57]. Efforts towards boosting women's empowerment, including deliberate policies to ensure girl-child education beyond the primary level, have huge potential in ending female circumcision. Previous studies corroborate the finding that higher education achieved by women and girls could reduce female circumcision [17, 35, 37].



## Limitations

This study has a number of limitations. First, recall bias could have limited the validity of the data, because some participants could have forgotten about past events involving FGM. Using different local languages to collect the data could also have distorted the presentation of the questions to the respondents. However, the standard training for fieldworkers and supervisors and the in-depth translation and back translation of the questions minimized the language bias.

## Conclusion

Despite a decline in female circumcision among women of reproductive age in the Bawku Municipality and the Pusiga District, FGM is still practiced. Implementing an intervention targeting community members, particularly women with little education, and intensifying girl-child education in those settings might have a huge impact on eradicating the practice.

## Abbreviation

FGM: Female Genital Mutilation

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## Availability of data and materials

All data generated or analysed during this study may be made available if authors are contacted at the Navrongo Health Research Centre.

## Authors' contributions

ES contributed to the study design and the data collection, performed the data analysis, interpreted the results, and drafted the manuscript. CAM and CD contributed to the study design, the data collection, analysis, interpretation, and critical revision of the manuscript. ARO, PW, RA, and JKS contributed to the study design, data collection, and critical revision of the manuscript. All authors read and approved the final manuscript.

## Ethics approval and consent to participate

We obtained ethical approval for the study from the Institutional Review Boards of the University of Michigan and the Navrongo Health Research Centre. The participants agreed to participate in this survey and signed an informed consent. If a participant was aged between 15 and 17 years, the consent of parent or legal guardian and the assent of the minor were obtained before the interview was conducted.

## Consent for publication

Not applicable

## Competing interests

The authors declare that they have no competing interests.

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## References

- UNICEF. Female Genital Mutilation/Cutting: A global concern [Internet]. New York: UNICEF; 2016. Available from: [https://www.unicef.org/media/files/FGMC\\_2016\\_brochure\\_final\\_UNICEF\\_SPREAD.pdf](https://www.unicef.org/media/files/FGMC_2016_brochure_final_UNICEF_SPREAD.pdf). [Cited 2018 Jan 18].
- World Health Organization. Understanding and addressing violence against women: Female Genital Mutilation [Internet]. Geneva: World Health Organization; 2012. Available from: [http://apps.who.int/iris/bitstream/10665/77428/1/WHO\\_RHR\\_12.41\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/77428/1/WHO_RHR_12.41_eng.pdf). [Cited 2018 Mar 26].
- UNICEF. Female Genital Mutilation/Cutting: A statistical overview and exploration of the dynamics of change [Internet]. New York: UNICEF; 2013. Available from: [https://www.unicef.org/media/files/UNICEF\\_FGM\\_report\\_July\\_2013\\_Hi\\_res.pdf](https://www.unicef.org/media/files/UNICEF_FGM_report_July_2013_Hi_res.pdf). [Cited 2017 Feb 23].
- Philip Adongo PA. Female genital mutilation: socio-cultural factors that influence the practice in Kassena-Nankana District. Ghana Afr J Reprod Health. 1998;2(2):25–36.
- Oduro AR, Ansah P, Hodgson A, Afful TM, Baiden F, Adongo P, Koram KA. Trends in the prevalence of female genital mutilation and its effect on delivery outcomes in the Kassena-Nankana District of northern Ghana. Ghana Med J. 2006;40:87–92.
- Abubakar S, Dery GL, Asaal P. Female Genital Mutilation in the Bawku Municipality [Internet]. 2013. Available from: [http://actionaid.org/sites/files/actionaid/final\\_fgm\\_research\\_in\\_uelrp-27-12-13\\_final\\_review\\_04-02-14\\_2.pdf](http://actionaid.org/sites/files/actionaid/final_fgm_research_in_uelrp-27-12-13_final_review_04-02-14_2.pdf). [Cited 2017 Oct 12].
- Odoi-Agyarko K. Female genital mutilation and obstetric sequelae in the Upper East Region of Ghana [PhD thesis]. Kumasi: Kwame Nkrumah University of Science and Technology; 2005.
- Utz-Billing I, Kentenich H. Female genital mutilation: an injury, physical and mental harm. J Psychosom Obstet Gynecol. 2008;29(4):225–9.
- WHO. Sexual and reproductive health: Health risks of female genital mutilation (FGM) [Internet]. 2017. Available from: [http://www.who.int/reproductivehealth/topics/fgm/health\\_consequences\\_fgm/en/](http://www.who.int/reproductivehealth/topics/fgm/health_consequences_fgm/en/). [Cited 2018 Jul 10].
- Terry L, Harris K. Female genital mutilation: a literature review. Nurs Stand. 2013;28(1):41–7.
- Berg RC, Denison E. Does female genital mutilation/cutting (FGM/C) affect Women's sexual functioning? A systematic review of the sexual consequences of FGM/C. Sex Res Soc Policy. 2012;9(1):41–6.
- WHO. A traditional practice that threatens health-female circumcision. WHO Chron. 1986;40(1):31–6.
- Karmaker B, Kandala NB, Chung D, Clarke A. Factors associated with female genital mutilation in Burkina Faso and its policy implications. Int J Equity Health. 2011;10:20. Available from: <https://equityhealth.biomedcentral.com/articles/10.1186/1475-9276-10-20>.
- Setegn T, Lakew Y, Deribe K. Geographic Variation and Factors Associated with Female Genital Mutilation among Reproductive Age Women in Ethiopia: A National Population Based Survey. PLoS ONE [Internet]. 2016. Available from: <https://doi.org/10.1371/journal.pone.0145329>. [Cited 2017 Oct 12].
- Shabila NP. Mothers' factors associated with female genital mutilation in daughters in the Iraqi Kurdistan region. Women Health. 2017;57(3):283–94.
- Berg RC, Denison E. A tradition in transition: factors perpetuating and hindering the continuance of female genital mutilation/cutting (FGM/C) summarized in a systematic review. Health Care Women Int. 2013;34(10):837–95.
- Fikrie Z. Factors associated with perceived continuation of females' genital mutilation among women in Ethiopia. Ethiop J Health Sci. 2010;20(1):49–53.
- Allam MF, de Irala-Estevez J, Fernandez-Crehuet-Navajas R, Serrano del Castillo A, Hoashi JS, Pankovich MB, et al. Factors associated with the condoning of female genital mutilation among university students. Public Health. 2001;115:350–5.
- Yirga WS, Kassa NA, Gebremichael MW, Aro AR. Female genital mutilation: prevalence, perceptions and effect on women's health in Kersa district of Ethiopia. Int J Womens Health. 2012;4:45–54.

20. Inungu J, Tou Y. Factors associated with female genital mutilation in Burkina Faso. *J Public Health Epidemiol.* 2013;5(1):20–8.

21. Battle JD, Hennink MM, Yount KM. Influence of female genital cutting on sexual experience in southern Ethiopia. *Int J Sex Health.* 2017;29(2):173–86.

22. Althaus FA. Female circumcision: rite of passage or violation of rights? *Int Perspect Sex Reprod Health.* 2017;23(3):130.

23. Ghana Government. The criminal code (amendment act), (act 484): an act to amend the criminal code, 1960 (act 29). 1994.

24. Berg RC, Underland V, Odgaard-Jensen J, Fretheim A, Vist GE. Effects of female genital cutting on physical health outcomes: a systematic review and meta-analysis. *BMJ Open.* 2014;4.

25. Abdulcadir J, McLaren S, Boulvain M, Irion O. Health education and clinical care of immigrant women with female genital mutilation/cutting who request postpartum reinfibulation. *Int J Gynaecol Obstet.* 2016;135(1):69–72.

26. Kasim K, Shaaban S, El Sadak AE, Hassan H. Impacts of female genital mutilation on Women's reproductive. *Health. J Community Med Health Edu.* 2012;2:137.

27. Abdulcadir J, Rodriguez MI, Petignat P, Say L. Clitoral reconstruction after female genital mutilation/cutting: case studies. *J Sex Med.* 2015;12(1):274–81.

28. Okonofua FE, Larsen U, Oronsaye F, Snow R, Slanger TE. The association between female genital cutting and correlates of sexual and gynaecological morbidity in Edo state, Nigeria. *BJOG.* 2002;109(10):1089–96.

29. Abdulcadir J, Dallenbach P. Overactive bladder after female genital mutilation/cutting (FGM/C) type III. *BMJ Case Rep.* 2013.

30. Kaplan A, Hechavarría S, Martín M, Bonhoure I. Health consequences of female genital mutilation/cutting in the Gambia, evidence into action. *Reprod Health.* 2011;8:26.

31. Akweongo P, Appiah-Yeboah S, Sakeah E, Phillips JF, Jackson E. It's a Woman's thing: gender roles sustaining the practice of female genital mutilation among the Kassena-Nankana of northern Ghana. In a paper presented at the Population Association of America, Washington; 2001.

32. Ghana Statistical Service. 2010 Population and Housing Census: Summary Report of Final Results. In Accra, Ghana: Ghana Statistical Service; 2012. Available from: [www.statsghana.gov.gh/docfiles/2010phc/Census2010\\_Summary\\_report\\_of\\_final\\_results.pdf](http://www.statsghana.gov.gh/docfiles/2010phc/Census2010_Summary_report_of_final_results.pdf). [Cited 2013 Dec 16].

33. Kadam P, Bhalerao S. Sample size calculation. *Int J Ayurveda Res.* 2010;1(1):55–7.

34. Ghana Statistical Service. 2010 Population and Housing Census: District Analysis Report, Pusiga District [Internet]. Accra, Ghana; 2014. Available from: [http://www.statsghana.gov.gh/docfiles/2010\\_District\\_Report/Upper%20East/Pusiga.pdf](http://www.statsghana.gov.gh/docfiles/2010_District_Report/Upper%20East/Pusiga.pdf). [Cited 2018 Apr 20].

35. Van Rossem R, Dominique Meekers D, Gage AJ. Women's position and attitudes towards female genital mutilation in Egypt: a secondary analysis of the Egypt demographic and health surveys, 1995–2014. *BMC Public Health.* 2015;15:874.

36. Ghana Statistical Service. 2010 Population and Housing Census: District Analysis Report, Bawku Municipality [Internet]. Accra, Ghana; 2014. Available from: [http://www.statsghana.gov.gh/docfiles/2010\\_District\\_Report/Upper%20East/Bawku%20Municipality.pdf](http://www.statsghana.gov.gh/docfiles/2010_District_Report/Upper%20East/Bawku%20Municipality.pdf). [Cited 2018 Apr 20].

37. Abebe MG, Assefa Tefera B, Kifle MW, Lindstrom B. Support for the continuation of female genital mutilation among adolescents in Jimma zone, Southwest Ethiopia. *Ethiop J Health Sci.* 2009;19(2):<https://doi.org/10.4314/ejhs.v19i2.69419>.

38. UNICEF. Changing a Harmful Social Convention: Female Genital Mutilation/Cutting [Internet]. 2008. Available from: [https://www.unicef-irc.org/publications/pdf/fgm\\_eng.pdf](https://www.unicef-irc.org/publications/pdf/fgm_eng.pdf). [Cited 2018 Mar 26].

39. Kyeremeh KG. Female Genital Mutilation Still Prevails In Ghana. *Ghanaweb* [Internet]. 2014. Available from: <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Female-Genital-Mutilation-Still-Prevails-In-Ghana-338034>. [Cited 2018 Mar 20].

40. Bogale D, Markos D, Kaso M. Prevalence of female genital mutilation and its effect on women's health in bale zone, Ethiopia: a cross-sectional study. *BMC Public Health.* 2014;14:1076.

41. Rahlenbeck SJ, Mekonnen W. Growing rejection of female genital cutting among women of reproductive age in Amhara, Ethiopia. *Cult Health Sex.* 2009;11(4):443–52.

42. Martinelli M, Ollé-Goig JE. Female genital mutilation in Djibouti. *Afr Health Sci.* 2012;12(2):412–5.

43. Malhotra A, Pande R, Grown C. Impact of Investments in Female Education on Gender Equality [Internet]. 2003. Available from: <http://siteresources.worldbank.org/INTGENDER/Resources/ImpactInvestmentsFemaleEdu.pdf>. [Cited 2018 Mar 27].

44. Williams N. Early marriage and female genital cutting in Ethiopia: Exploring the links [Internet]. 2014. Available from: <https://www.girlsnotbrides.org/early-marriage-female-genital-cutting-ethiopia-exploring-links/>. [Cited 2018 Jan 20].

45. The Guardian. 'I believed no man would marry me if I didn't cut': battling FGM in Uganda. 2018; Available from: <https://www.theguardian.com/global-development/2018/feb/06/battling-fgm-uganda-kenya-zero-tolerance-female-genital-mutilation>.

46. Gruenbaum E. The Islamic movement, development and health education: recent changes in the health of rural women in Central Sudan. *Sci Med.* 1991;33(6):637–45.

47. Baker CA, Gilson GJ, Vill MD, Curet LB. Female circumcision: obstetric issues. *Am J Obstet Gynaecol.* 1993;167:1616–8.

48. WHO. Female genital mutilation and other harmful practices [Internet]. 2018. Available from: <http://www.who.int/reproductivehealth/topics/fgm/fgm-sexuality/en/>. [Cited 2018 Mar 27].

49. KG F. Female genital mutilation: a violation of human rights. *J Pol Sci Pub Aff.* 2016;4:198.

50. UNFPA. For many girls, school holidays means FGM “cutting season.” [Internet]. 2017. Available from: <http://www.unfpa.org/cuttingseason>. [Cited 2018 Mar 27].

51. World Health Organization. A traditional practice that threatens health—female circumcision. *WHO Chron.* 1986;40:31–6.

52. Mackie G. Ending footbinding and infibulation: a convention account. *Am Sociol Rev.* 1996;61:999–1017.

53. Adhikari R. Effect of Women's autonomy on maternal health service utilization in Nepal: a cross sectional study. *BMC Womens Health.* 2016;16:26.

54. Ganle JK, Obeng B, Segbefia AY, Mwinuyiri V, Yeboah JY, Baatiema L. How intra-familial decision-making affects women's access to, and use of maternal healthcare services in Ghana: a qualitative study. *BMC Pregnancy Childbirth.* 2015;15:173.

55. Morzaria M, Ahmed Z. Education and awareness make progress against female genital cutting in Kenya [Internet]. Kenya; 2006. Available from: [https://www.unicef.org/protection/kenya\\_35433.html](https://www.unicef.org/protection/kenya_35433.html). [Cited 2017 Aug 9].

56. Tesfahun F, Worku W, Mazengiya F, Kifle M. Knowledge, perception and utilization of postnatal Care of Mothers in Gondar Zuria District, Ethiopia: a cross-sectional study. *Matern Child Health J.* 2014;18(10):2341–51.

57. ICRW. Leveraging education to end female genital mutilation/cutting worldwide [Internet]. 2016. Available from: <https://www.icrw.org/wp-content/uploads/2016/12/ICRW-WGF-Leveraging-Education-to-End-FGM-C-Worldwide-November-2016-FINAL.pdf>. [Cited 2018 Apr 27].

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