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Female life expectancy, maternal mortality, fertility and birth rates of female genital mutilation high prevalence countries

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ABSTRACT

Female genital mutilation/cutting FGM/C is the process of removing part or all of the female external genitalia. Twenty-nine countries are known to be FGM/C prevalent. The prevalent countries are mostly in Sub Saharan Africa, Middle East, and Asia. FGM/C prevalence countries have total high fertility rate (TFR), high maternal mortality ratio (MMR), low female life expectancy (LEF) and high birth rate (BR). This paper extracted the TFR, MMR, LEF, and BR of FGM/C prevalent countries from each metric's comprehensive databases. Correlation analysis was used to find links between FGM/C and the four health metrics. There is a significant negative correlation between TFR and the duo of LEF and BR, which implies that having more children reduces women's life expectancy and FGM/C prevalent countries. The average TFR, MMR, LEF and BR for the 29 countries are 4.44 children, 517.24 deaths per 10,000, 63.03 years, and 33.83 per 1000 population. Behavioral change and maternal education are recommended to change the religious and cultural view of female sexuality and reduce FGM/C prevalence.

Female genital mutilation/cutting in prevalent countries

Female genital mutilation/ cutting (FGM/C) or female circumcision is the act of wholly or partial removal of external female genitalia or any other known injury to the female genital organs for a non-therapeutic reason, which medical experts have condemned and categorized as having no known medical benefits [1]. Millions of girls from countries in Sub Saharan Africa, Middle East and Asia are cut each year, which has been condemned by international health organisations and designated as a violation of the girl child's reproductive and general human rights. Severe bleeding is often associated

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with FGM/C and the use of contaminated instruments in the process exposes the victim to Hepatitis B virus (HBV), human immunodeficiency virus (HIV), human papillomavirus (HPV) and other sexually transmitted infections [2]. Other adverse manifestations of FGM/C include urinary difficulties and incontinence [3], cysts, complications during childbirth, sexual dysfunction [4], and stillbirth. Women who had undergone FGM/C are more vulnerable to mental health disorders such as depression and trauma [5]. The riskiest age group is between 0 and 15, and 29 countries are the most prevalent. The list of the countries is contained in the **Supplementary Data**. The risk is not limited to girls in prevalent countries and female children of immigrants where parents arranged for their female children to travel to their home countries for the exercise [6]. These present a considerable challenge because the countries hosting the immigrants may not have special training needed to manage FGM/C [7]. Traditional circumcisers are mandated by their respective communities to carry out the procedure [8]. At times trained medical personnel is recruited to carry out the procedure which they claim is safer (medicalisation of FGM/C). Both traditional or medicalized procedures are neither recommended nor a shift from conventional circumcision to medicalisation to justify the continuation of the process [9]. Four types of FGM/C exist, but the health consequences are nearly the same. Although the trend is falling [10], the prevalence may not fully represent the true picture as the FGM/C is usually carried discreetly because the practice has been declared illegal, hence many cases remain hidden and not reported, especially in rural and remote settings [11]. This explains the disparities between the prevalence of FGM/C in rural and urban settings in the prevalent nations of Africa, the Middle East, and Asia [12]. Hence, FGM/C's regional prevalence in a country may be higher than the national prevalence [13]. Apart from geographical disparities, ethnic and racial disparities exist in the prevalence [14].

Cultural, religious, and social variables are the main predictors of FGM/C [15-16]. Hence, the practice is seen as a process of deepening and complying with religious obligations. Departure from the practice is taken as a violation of the cultural norm. Regrettably, the practice linked female sexuality to cultural norms and or religious rules to be conformed with to not seem as rebellious to the established rules and processes. Maternal education and occupation [17], early marriage and poverty [18] and the poor state of health care facilities are significantly associated with the FGM/C incidence. Maternal educational level appears to be the strongest predictor of FGM/C [19]. The proponents of FGM/C claim that the act ensures sexual chastity, purity, undefiled, modesty [20], and helps to reduce infidelity and sexual promiscuity. The claims that the process is supported by religion cannot be substantiated by any religious texts. FGM/C is normative in the prevalent countries and viewed as an acceptable means of lowering libido and hence, controlling female sexuality [21]. Unfortunately, it is a calculated attempt to control female sexuality and is deeply rooted in gender inequality (most of the prevalent countries are viewed as patriarchal societies because of culture and religion). Reconstructive surgery and deinfibulation are some of the treatment options that can help remedy or alleviate the physiological and psychological effects of FGM/C [22].

The paper aims at exploring the female life expectancy (LEF), maternal mortality ratio (MMR), total fertility rate (TFR) and birth rates (BR) of FGM/C high prevalence countries and establish some relationship among the different health indices. The research outcome of linking FGM/C will present key health information to regional and international health organization since it has been established in [23], that FGM/C contributes significantly to maternal morbidity and mortality in prevalent countries.

The data used in this paper were obtained as follows: The Percentage of girls and women aged 15 to 49 years who have undergone FGM/C was obtained from [24] as the data contains the prevalence of the 29 endemic countries in percentages. Fertility rate (children born of a woman), the 2017 estimate was obtained from [25]. Maternal mortality ratio per 10,000 women, the 2017 estimate was obtained from [26]. Life expectancy for females, the 2017 estimate was obtained from [27], and the birth rate (birth rate per 1000 population) was obtained from [28].

Data from the 29 FGM/C prevalent countries were extracted from [25-28] and analyzed using Minitab 17.0 software. Descriptive statistics and correlation analysis were performed to determine the relationship among the indices. Furthermore, Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (S-W) tests were conducted as tests for normality.

The mean prevalence of FGM/C in endemic countries is 45% (31.62, 58.39)%. All other descriptive statistics are presented in Table 1. On average, the TFR, MMR, LEF, and BR are 4.44, 517.24, 63.03, and 33.83, respectively. The median estimates in all cases are less than the mean values. Hence the skewness is positive in the five indices. Correlation results presented in Table 2 showed no significant correlation between FGM/C and any of the other four indices. However, significant positive correlations exist between TFR and BR.

On the other hand, significant negative correlations exist between TFR and LEF, MMR and LEF, and LEF and BR. Two normality tests were performed; Kolmogorov–Smirnov (K-S) test and Shapiro–Wilk test (S-W) test. Normality tests presented in Table 3 showed that all but FGM/C is normally distributed. The outcome is expected since the 29 FGM/C prevalence countries have distinct prevalence rates ranging between 0.3% and 98% and the data did not cluster at the center. This partly contributes to the lack of a significant correlation between FGM/C and others.

The estimated average number of children per woman in FGM/C prevalence countries is 4.44. Despite FGM's prevalence, women in FGM/C prevalence countries have more children than those in countries where FGM/C is not prevalent. Could it be that FGM/C reduces the TFR in endemic countries, though this study found a non-significant negative correlation between the two? It could be explained that FGM/C complications reduce the number of children born by women in FGM/C countries. Could it be why the shift from traditional circumcision to medicalisation is because FGM/C could help birth control?

The average maternal mortality ratio per 100,000 live births is 517.24 in FGM/C prevalence countries. This is higher than in most countries where FGM/C is not prevalent. A non-significant positive correlation between FGM/C and MMR implies

Table 1
Descriptive statistics of the five health indices.

Statistic	FGM/C	TFR	MMR	LEF	BR
Mean	45.01	4.44	517.24	63.03	33.83
Std. Error	6.53	0.18	51.10	1.14	1.01
95% CI LB	31.62	4.07	412.57	60.69	31.76
95% CI UB	58.39	4.80	621.91	65.37	35.91
Median	38	4.34	509	64.10	34.3
Variance	1238.04	0.90	75,723.97	37.96	29.83
Std. Deviation	35.18	0.95	275.18	6.16083	5.46
Minimum	0.30	2.31	37	51.90	23.4
Maximum	98	6.49	1140	77.20	44.2
Range	97.70	4.18	1103	25.30	20.8
Skewness	0.176	0.13	0.55	0.09	0.13
Kurtosis	−1.64	0.01	0.14	−0.15	−0.38

LB = lower bound; OP = upper bound.

Table 2
Correlation among each pair of the indices.

R	TFR	MMR	LEF	BR
FGM/C	−0.121	0.136	0.054	−0.105
TFR		0.287	−0.477*	0.979*
MMR			−0.704*	0.332
LEF				−0.522*

*$P < 0.01$.

Table 3
Normality tests for the indices.

	K-S statistic	S-W statistic
FGM/C	0.173**	0.881*
TFR	0.087	0.985
MMR	0.112	0.965
LEF	0.101	0.971
BR	0.109	0.973

*$P < 0.01$; **$P < 0.05$.

that to some certain extent, countries with a high prevalence of FGM/C have high MMR. The weak correlation could be due to other factors that highly contribute to maternal deaths in endemic countries.

The average female life expectancy in FGM/C prevalence countries is 63.03 years. This showed that the FGM/C prevalent countries have similar factors that contribute to reducing female life expectancy. This study showed a weak positive relationship between FGM/C and LEF. This study has shown that FGM/C contributes almost insignificantly to the reduction of LEF. Other factors such as malaria, HIV/AIDS, poverty, illiteracy, malnutrition, insecurity, HBV, cholera, lack of access to drinking water, environmental pollution, and poor living conditions contribute more to reducing female life expectancy in FGM/C prevalent countries.

The average birth rate per 1000 populations in FGM/C prevalent countries is 33.83, which is higher than in most countries that are not FGM/C prevalent. The non-significant negative correlation between FGM/C and BR found in this paper showed that FGM/C slightly reduces the birth rate in those countries.

There exists a significant negative correlation between TFR and LEF, which implies that having more children reduces the life expectancy of women in FGM/C prevalent countries. Similarly, the LEF is reduced when there is an increase in BR as shown in this paper. Poor living conditions in FGM/C prevalence countries could be responsible. The complications from FGM/C places a considerable risk for expectant mothers at each birth. More children mean more income and more food. Also, the stress accompanied by the raising of children under poor living standards reduces women's life span in those countries.

The strong positive correlation between TFR and BR obtained in this work is expected as the two indices are related as having more children increases the birth rate, FGM/C notwithstanding. On the other hand, it is no surprise that LEF is strongly negatively correlated with MMR. Countries with high average life expectancy have both low maternal and paternal mortality ratios of which, the study has found that FGM/C prevalent countries are no exception.

The health complications arising from FGM/C outweighs any unscientific claims of benefits. Unfortunately, the recent shift to medicalisation convinced too little of the perceived benefits (Bedri et al. [29]). Criminalization of the process has only slowed the trajectory (Alkhalaileh et al. [30]) and behavioural change is highly recommended (Cetorelli et al. [31]), which should be targeted on changing the traditional view of female anatomy and sexuality (Ida & Saud [32]). Religious, traditional and political leaders are to form a synergy in creating awareness, ensuring compliance with the ban and educating mothers

on the dangers of the procedure. Arming young females with adequate information is likely to achieve the generational break of transmission of the practice. Research suggests that daughters of cut mothers have high odds of being cut (Kandala et al. [33]). Awareness of the health implications, promotion of gender equality, behavioural, cultural, and religious change in female sexuality perception is highly recommended. The recommendation is based on the fact that the FGM/C practices continue despite its prohibition in several countries (Morhason-Bello et al. [34]). Reconstructive surgery for victims should be made affordable or subsidized by the respective Governments to accelerate their healing process after the painful exercise. Experts in sexual and maternal health should be trained to expertly handle cases of complications resulting from FGM/C practice.

The implications of this paper are as follows. First, FGM/C practices have not lead to a significant reduction of births or fertility rates in prevalent countries but have led to a slight increase in MMR. A target strategy towards eradicating the practice of FGM.C will help to reduce the MMR of the prevalent countries. Second, an effort is urgently needed to reduce the birth rate in the prevalent countries as a high birth rate reduces the LEF. Lastly, a campaign against FGM/C practice will improve maternal health, especially in prevalent countries.

Research limitations

The paper considered only 29 FGM/C prevalent countries. The result will undoubtedly change when FGM/C non prevalence countries are included. All result interpretations apply to the said countries only.

Declaration of Competing Interest

None declared.

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Ethical approval

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Supplementary materials

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