



OPEN ACCESS

Factors associated with female genital mutilation: a systematic review and synthesis of national, regional and community-based studies

Zeinab El-Dirani , Leen Farouki, Christelle Akl, Ubah Ali, Chaza Akik, Stephen J McCall

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/bmjshr-2021-201399>).

Center of Research on Population and Health, Faculty of Health Sciences, American University of Beirut, Beirut, Lebanon

Correspondence to

Dr Stephen J McCall, Faculty of Health Sciences, American University of Beirut, Beirut, Lebanon; sm227@aub.edu.lb

ZE-D and LF contributed equally.

Received 28 October 2021

Accepted 16 February 2022



Check for updates

© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: El-Dirani Z, Farouki L, Akl C, et al. *BMJ Sex Reprod Health* Published Online First: [please include Day Month Year]. doi:10.1136/bmjshr-2021-201399

ABSTRACT

Background This systematic review aimed to identify and describe the factors that influence female genital mutilation/cutting (FGM/C).

Methods Searches were conducted in Medline, PsycInfo, Web of Science, Embase and the grey literature from 2009 to March 2020 with no language restrictions, using related MESH terms and keywords. Studies were included if they were quantitative and examined factors associated with FGM/C. Two researchers independently screened studies for inclusion, extracted data and assessed study quality. The direction, strength and consistency of the association were evaluated for determinants, presented as a descriptive summary, and were disaggregated by age and region.

Results Of 2230 studies identified, 54 published articles were included. The majority of studies were from the African Region (n=29) followed by the Eastern Mediterranean Region (n=18). A lower level of maternal education, family history of FGM/C, or belonging to the Muslim religion (in certain contexts) increased the likelihood of FGM/C. The majority of studies that examined higher paternal education (for girls only) and living in an urban region showed a reduced likelihood of FGM/C, while conflicting evidence remained for wealth. Several studies reported that FGM/C literacy, and low community FGM/C prevalence were associated with a reduced likelihood of FGM/C.

Conclusions There were several characteristics that appear to be associated with FGM/C, and these will better enable the targeting of policies and interventions. Importantly, parental education may be instrumental in enabling communities and countries to meet the Sustainable Development Goals.

INTRODUCTION

Female genital mutilation (FGM), also known as female genital cutting (FGC),

Key messages

- ⇒ This systematic review identified 54 articles; most studies were from the African Region, were household surveys and used self-report of female genital mutilation (FGM).
- ⇒ Higher levels of parental education appeared to be protective against FGM in the majority of studies that examined this factor.
- ⇒ Most studies identified that family history of FGM, living in a rural area, and having specific religious beliefs increased the likelihood of FGM.

refers to procedures that involve alteration of female genitalia without a medical or therapeutic reason.¹ The United Nations Sustainable Development Goals (SDG target: 5.3) calls for ending FGM/C as a harmful traditional practice against women and girls by 2030.² The World Health Organization (WHO) has classified FGM/C into four different types: Type I, removal of the clitoral glands; Type II, removal of the clitoral glands and labia minora; Type III, narrowing of the vaginal opening, which is known as infibulation; and Type IV, all other harmful non-medical modifications to the female genitalia.³ Women and girls who undergo FGM/C suffer from a spectrum of short- and long-term complications such as psychological trauma, menstrual problems and chronic infections depending on the type of FGM/C and conditions under which the procedure is performed.⁴

The prevalence of FGM/C varies between continents and countries, with the highest rates being reported in the

African Region (AFR),⁵ with almost all women in Somalia, Guinea and Djibouti having undergone FGM/C.^{6–8} In high-resource settings, FGM/C is localised to migrant and refugee communities.^{9 10}

Household surveys, such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS), provide the mainstay of data on FGM/C and allow progress towards the Sustainable Development Goals to be monitored across countries and regions.¹¹ A better understanding of the risk factors and social determinants associated with FGM/C will enable key stakeholders and policymakers to better inform and strengthen programmatic interventions that aim to eliminate FGM/C. Thus, an understanding of these factors is essential to progress towards eliminating FGM/C and achieving SDG 5.3. This systematic review aimed to comprehensively examine the factors associated with FGM/C, including risk factors, protective factors and social determinants in different geographic regions and countries.

METHODS

Search strategy

A systematic search of published articles was conducted in Medline, PsycInfo, Web of Science and Embase databases from inception to March 2020 with no language restrictions. In addition, searches of the grey literature were also conducted including reports of international non-governmental organisations and Google searches. The search was limited to include studies published between 2009 and 2020. The search terms included various synonyms of FGM/C such as ‘female genital cutting’, ‘female genital alteration’ and ‘female genital circumcision’. The search strategy is further detailed in online supplemental table 1. Duplicates were removed in EndNote and articles were imported to Distiller SR software.¹² The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guideline was followed.¹³

Inclusion and exclusion criteria

This study was part of a systematic review on FGM/C that examined the prevalence and risk factors of FGM.¹⁴ Studies were included if they examined factors associated with FGM/C, had a case-series, cross-sectional, case-control or cohort design, and compared factors between women or girls with FGM/C to those without FGM/C. Factors examined in this systematic review correspond to risk factors, protective factors and social determinants of FGM/C. We excluded studies that did not report on factors associated with FGM/C using quantitative methods, studies that only presented perspectives or attitudes towards FGM/C, systematic reviews, conference proceedings and letters to editors. Where studies have used the same data source, the most recent publication was included in the review.

Definition of FGM/C

The outcome in this systematic review is FGM/C, which refers to all procedures that involve the total or partial removal of external female genitalia or other injuries to the female genital organs.³

Study selection

Two researchers independently screened the titles and abstracts of the articles to determine whether studies qualified for full-text review. At the full-text review stage, two researchers independently assessed the eligibility of studies for inclusion and stated the reasons for exclusion. Disagreements were reconciled through consulting a third reviewer as necessary.

Data extraction

Data were extracted by two reviewers using a tailored data extraction form on Distiller SR.¹² Data from each study were extracted by one reviewer, which was verified by a second reviewer. Disagreements were addressed through discussion and with a third reviewer as necessary. Information extracted from each article included: author, publication year, year of data collection, the age range of the population or sample, study design, sample size, sampling method, country of origin, host country/region, FGM/C type, and risk or protective factor or social determinant of FGM/C. Factors were considered to be any variables that could have a plausible causal relationship with FGM/C. For each factor, the odds ratio (OR), risk ratio and 95% confidence interval (95% CI) were extracted for both unadjusted and adjusted analyses. If a study did not present a point estimate, the proportion in each category and the P-value were extracted.

Study quality assessment and risk of bias

The risk of bias of included studies was assessed using the Clarity Group assessment tool, McMaster University.^{15 16} Answers to the tool measures were either ‘definitely yes’ (low risk of bias), ‘probably yes’, ‘probably no’ or ‘definitely no’ (high risk of bias). We rated the studies as ‘low risk of bias for all key domains’, ‘unclear risk of bias for one or more key domains’ and ‘high risk of bias for one or more key domains’. No study was excluded from this systematic review based on the methodological quality.

Data synthesis

Any variables considered to have a causal relationship with FGM/C were included in the data synthesis. A meta-analysis was not possible due to the large heterogeneity between studies. As a result, data from included studies were analysed using narrative synthesis. In particular, associated factors were grouped to reflect three different levels of the socio-ecological model (individual, parental/household and community levels). These were categorised into either protective factors or risk factors. Results from individual studies

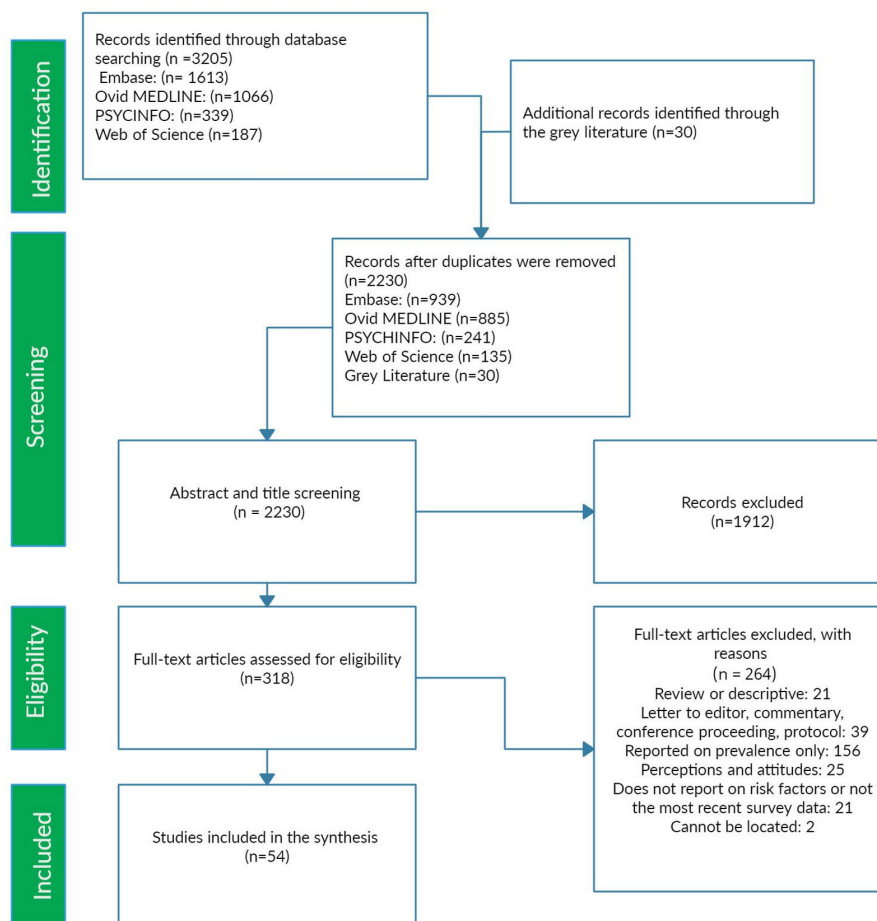


Figure 1 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow chart of study selection.

were further described according to age group (women or girls), country of origin, and WHO region (online supplemental table 2).

Public patient involvement

Ubah Ali, a co-author of this review, is a survivor of FGM and co-founder of Solace for Somaliland Girls, an organisation committed to eradicating all types of FGM across communities in Somaliland. She assisted in the interpretation of the data and drafting of the manuscript to ensure contextualisation of the findings.

RESULTS

A total of 3205 records were retrieved from the databases and the grey literature. After duplicates were removed, 2230 abstracts were screened. A total of 318 articles were selected for full-text assessment, of which 54 were included in the final analysis (figure 1). Of those, 33 studies examined FGM/C status among women of reproductive age, 19 studies examined FGM/C in girls aged 0–15 years and two studies examined FGM/C in both the mother and daughter. In the latter two studies, data were presented for both women and daughters.^{17 18} Eight studies had overlapping age groups where the authors did not segregate results between women and girls. These studies were

categorised into the most appropriate category as either women^{19–21} (table 1) or girls^{22–26} (table 2).

The main modality of data collection was household surveys (n=21), including seven studies that used MICS or DHS data, followed by hospitals or clinics (n=16), community-based studies (n=8), schools or universities (n=6) and databases or online survey (n=3). Most studies reported data on FGM/C based on participants' or parents' self-reporting (n=43) and 11 were based on physical examination. Only 22 studies reported on who performed FGM/C; among these, 16 showed that the procedure is most often carried out by a traditional practitioner (data not presented). Over half the studies were conducted in the AFR (n=29), followed by the eastern Mediterranean region (EMR) (n=18), European region (n=3), region of the Americas (n=3) and western Pacific region (WPR) (n=1). Seven studies described the determinants of FGM/C among migrants or refugees in high-resource settings.^{10 27–32} Sample sizes in the included articles ranged from 200 to 46 713, with 33 studies based on a sample size of fewer than 1000 women or girls. The range was smaller in migrant studies from 23 to 2173 women. All studies were cross-sectional except four studies that utilised a case-control design.^{10 19 33 34} Characteristics of all

Table 1 Determinants of female genital mutilation/cutting (FGM/C) among women of reproductive age (15–49 years)

Level	Determinant	Risk factor		Protective effect		Not statistically significant	
		Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Individual	Increased wealth	1 study ⁶⁷	2 studies ^{37 40}	1 study ³⁴	2 studies ^{17 51}	3 studies ^{18 29 54}	1 study ⁶⁸
	Muslim	3 studies ^{27 28 30}	6 studies ^{19 31 36 40 58 61}			3 studies ^{41 54 62}	3 studies ^{51 63 68}
Parental factors	Maternal education (high)			2 studies ^{20 56}	3 studies ^{36 51 61}	1 study ⁵⁴	1 study ⁵²
	Paternal education (high)			2 studies ^{20 56}	1 study ⁵²	1 study ⁵⁴	1 study ⁵¹
	Mother subjected to FGM/C	1 study ⁶⁰	3 studies ^{37 51 52}				
	Mother's occupation (employed)			1 study ⁵⁰			
Household	Other family members subjected to FGM/C	1 study ⁶⁰	1 study ⁵¹				
Community	FGM/C is required by religion		1 study ⁶¹				
	Urban region	1 study ¹⁸	2 studies ^{19 40}	5 studies ^{20 33 49 54 56}	3 studies ^{36 51 61}	2 studies ^{41 42}	1 study ³⁷

Studies^{19–21} have overlapping age groups.

included studies are described in online supplemental table 2.

Across all studies, there were 34 determinants identified, which were either protective or risk factors for FGM/C. The most common determinants reported among women and girls are summarised in tables 1 and 2, respectively, and include being a Muslim (n=24), mother's level of education (n=24 studies) and area of residence (urban or rural) (n=23). A detailed description of the association of these factors with FGM/C status (results by study) is available in online supplemental table 3. Other less common factors are described in online supplemental table 4.

Risk of bias

Overall, eight articles showed a low risk of bias,^{26 35–41} 20 articles had a high risk of bias^{10 21 24 25 27 30–32 34 42–52} and 26 articles demonstrated an unclear risk of bias.^{17–20 22 23 28 29 33 53–69}

Factors associated with FGM/C

Individual characteristics

Wealth

The association between wealth and FGM/C was examined in 10 studies conducted among women of reproductive age^{17 18 29 34 37 40 51 54 67 68} and eight in girls.^{17 18 22 38 39 59 64 66} Overall, 9⁶⁶ of 18 studies showed little to no influence for wealth on the FGM/C status of women and girls.^{18 22 29 38 39 54 64 66 68} Three of 10 studies showed that being in a higher wealth quintile was protective against FGM/C among women of reproductive age^{17 34 51} and two of eight studies showed that an increase in household wealth decreased the likelihood of having a daughter subjected to FGM/C.^{17 59}

Religion

Twenty-four studies assessed the association between being Muslim and FGM/C status among women (n=15) and girls (n=9).^{18 19 22 23 27 28 30 31 35 36 39–41 46 51 54 57–59 61–63 66 68}

Overall, 15 studies found a significant positive association between being Muslim and FGM/C status^{18 19 22 27 28 30 31 35 36 39 40 57–59 61} and nine found no significant relationship.^{23 41 46 51 54 62 63 66 68} These results were context specific. In addition, a study in Iran found that Sunni Muslim women were more likely to have FGM/C than Shi'a Muslim women.⁶⁰ (see tables 1 and 2)

Parental characteristics

Mother's age

Nine studies examined the association between mother's age and daughter's FGM/C status.^{17 35 38 39 45 55 59 64} Daughters of mothers of older age were more likely to have FGM/C in four of nine studies.^{17 35 38 45} Among a pooled sample of six DHS surveys from Nigeria, Egypt, Mali, Kenya, Guinea and Burkina Faso, the age of the mother did not have a statistically significant association with FGM/C.⁵⁹

Maternal education

Seven studies assessed the influence of the level of maternal education on FGM/C among women of reproductive age.^{20 36 51 52 54 56 61} A higher level of maternal education was protective against FGM/C, particularly among women whose mothers had attained primary level education compared with uneducated women,^{20 36 51} were literate versus illiterate⁵⁶ or had reached secondary level schooling and above compared with primary education or no education.⁶¹

Seventeen studies assessed the influence of the mother's level of education on FGM/C among girls and daughters.^{17 22–26 35 38 39 44 45 55 57 59 64 66 69} Fourteen out of seventenn studies showed that increased maternal education, in particular, being literate versus illiterate,^{38 55} and having a secondary or higher level of education^{17 23 25 26 35 44 59 69} decreased the likelihood of FGM/C among daughters. All 17 studies were either conducted in the AFR (13 studies) or the

Table 2 Determinants of female genital mutilation/cutting (FGM/C) among girls and infants

Level	Determinant	Risk factor		Protective effect		Not statistically significant	
		Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Parental factors	Mother's increased age	1 study ⁴⁵	3 studies ^{17 35 38}		1 study ⁶⁶	3 studies ^{39 59 64}	1 study ⁵⁵
	Increased wealth			1 study ⁵⁹	1 study ¹⁷	3 studies ^{18 39 64}	3 studies ^{22 38 66}
	Muslim	3 studies ^{18 57 59}	3 studies ^{22 35 39}			1 study ⁴⁶	2 studies ^{23 66}
	Maternal education (high)	1 study ⁶⁶		6 studies ^{17 23 25 45 59 69}	8 studies ^{22 24 26 35 38 44 55 57}	2 studies ^{39 64}	
	Paternal education (high)			4 studies ^{23 25 45 69}	2 studies ^{44 55}	2 studies ^{46 64}	2 studies ^{22 24}
	Mother subjected to FGM/C	1 study ⁵⁹	2 studies ^{17 35}	1 study ⁶⁶			1 study ³⁹
	Mother's occupation (employed)		1 study ⁵⁷			3 studies ^{25 59 64}	4 studies ^{23 38 39 44}
	Father's occupation (employed)			1 study ²⁵		1 study ⁶⁴	2 studies ^{23 44}
	Mother's marital status (currently married)	1 study ^{69*}				1 study ³⁹	2 studies ^{38 55}
	Mother's knowledge on FGM/C (high)			1 study ²⁵	1 study ³⁸		2 studies ^{55 65}
Household	Mother's support of FGM/C continuation	3 studies ^{17 38 39}					1 study ⁶⁶
	Other family members subjected to FGM/C		1 study ⁴⁴				
Community	FGM/C is required by religion	2 studies ^{22 25}				1 study ³⁹	
	Urban region			1 study ⁵⁹	4 studies ^{23 38 55 58}	2 studies ^{39 46}	2 studies ^{22 44}

Studies²²⁻²⁵ have overlapping age groups.

*Higher odds ratio for married versus single or divorced (excluding widowed).

EMR (4 studies). Higher levels of maternal education decreased the likelihood of daughter's FGM/C in three of four studies conducted in the EMR^{17 26 44} and 11 of 13 studies conducted in the AFR.^{22–25 35 38 45 55 57 59 69}

Paternal education

Higher paternal education was protective against FGM/C in three of five studies conducted among women of reproductive age,^{20 52 56} while two studies showed no association between paternal education and FGM/C.^{51 54} All five studies were conducted in the EMR.^{20 51 52 54 56} Six of 10 studies conducted among daughters demonstrated that the risk of FGM/C decreases with increased level of paternal education.^{23 25 44 45 55 69} One of the four studies, which showed no statistically significant relationship, examined FGM/C among infants⁴⁶ rather than adolescents or young children.

Parents' occupational status and employment

The relationship between having a mother who is a professional or an employee was examined in nine studies and was found to be protective in one study,⁵⁰ a risk factor in one⁵⁷ and not statistically significant in seven studies.^{23 25 38 39 44 59 64} In two studies, the relationship was statistically significant at the unadjusted level but was no longer statistically significant after adjusting for confounders.^{23 44}

One of four studies showed that an employed fathers had a lower prevalence of FGM/C among daughters than unemployed fathers,²⁵ and the relationship was not statistically significant in three studies.^{23 44 64}

Family history of FGM/C

Ten studies examined whether a family history of FGM/C affected the likelihood of FGM.^{17 35 37 39 44 51 52 59 60 66} In particular, nine studies investigated the relationship between the FGM/C status of girls based on whether their mothers had FGM/C.^{17 35 37 39 51 52 59 60 66} Having a mother with FGM/C led to higher odds of a daughter(s) having FGM/C in seven of nine studies.^{17 35 37 51 52 59 60} The relationship was especially strong in Iraq (Kurdistan) (adjusted OR (AOR) 15.1, 95% CI 10.6 to 21.6),⁵² Eritrea (AOR 8.59, 95% CI 5.63 to 13.10),³⁵ Egypt (Sohag and Qena) (AOR 9.12, 95% CI 2.11 to 14.09)⁵¹ and Yemen (AOR 7.40, 95% CI 6.01 to 9.13).¹⁷ Having a family member such as a sister or a grandmother subjected to FGM/C significantly increased the likelihood of being subjected to FGM/C in all three studies reporting FGM/C family history.^{44 51 60}

Community-level determinants

Urban versus rural region

Twenty-three studies examined whether FGM/C status differed between urban and rural areas.^{18–20 22 23 33 36–42 44 46 49 51 54–56 58 59 61} Of the 23 studies, 13 showed that women living in urban areas were less likely to be subjected to FGM/C,⁴⁴ seven

studies did not show a statistically significant association^{22 37 39 41 42 44 46} and three studies showed that living in an urban area increased the likelihood of FGM/C.^{18 19 40} In a study based in Somalia, daughters of women residing in an urban area were 70% less likely to have FGM/C.³⁸ Living in a rural area was one of the most influential sociodemographic characteristics affecting FGM/C among a sample of young women in Egypt (OR 8.2).⁵¹ Conversely, among Kenyan girls (aged 0–14 years) there was no statistically significant difference of FGM/C by place of residence.³⁹

FGM/C as a religious requirement

Four studies examined the association between FGM/C and its practice on religious grounds among girls^{22 25 39} and among women aged 15–24 years.⁶¹ All four studies were conducted in the AFR, and three of these studies found a statistically significant association.^{22 25 61}

Other risk factors identified from the literature

Several other determinants were reported in the studies. Mothers who had a positive attitude towards FGM/C continuation were more likely to have a daughter subjected to FGM/C in three of four studies.^{17 38 39} Girls whose mothers had lower knowledge of FGM/C complications were more likely to be subjected to this practice in one of three studies.²⁵ The participation of parents in anti-FGM/C activities was associated with a lower likelihood of FGM/C for their daughters in both studies.^{55 65} Some determinants were only examined in one study and showed a positive association with FGM/C such as mother's underage marriage,¹⁷ high village FGM/C rate,²² cultural influence to perform FGM/C or community acceptance⁵⁵ or being an undocumented migrant.²⁸ There was no statistically significant association between FGM/C status and women's decision-making ability,⁵⁹ women's ownership of land³⁹ and domestic abuse³⁹ (online supplemental table 4).

DISCUSSION

This study showed that there was a wide variety of determinants for FGM/C at the individual, familial, community and structural levels. Parental education and living in an urban area appeared to have protective effects against FGM/C for both women and girls in the majority of studies. For both women and girls, the majority of studies showed that being a Muslim, perceiving that FGM/C has religious grounds, and having a family history of FGM/C were risk factors for FGM/C. Furthermore, proxy factors related to women's status in society appeared to be related to FGM/C, such as underage marriage and education.

FGM/C is a harmful practice that removes healthy female genital tissue causing short- and long-term impacts on the health and well-being of women.⁷⁰ Furthermore, the practice violates the human rights of women and girls and is an extreme form of

discrimination.⁷¹ In addition to the individual and societal impacts, the estimated economic cost of FGM/C due to obstetric, gynaecological, mental and sexual complications amounts to US\$1.4 billion every year.⁷²

Results in context

FGM/C is a result of interrelated and complex factors associated with gender norms; this review showed that the literature focused on determinants at the micro and meso levels, and data were scarce on the impact of social norms on FGM/C. Social norms are unhidden rules among community members that guide behaviour by setting a perception of rewards, benefits or punishment.⁷³ Furthermore, women and girls have a social obligation to continue with FGM/C, and deciding to stop the practice places women and girls at risk of shame, stigmatisation, exclusion and rejection from their communities.⁷¹

This study demonstrated that the majority of studies that examined rurality or family history of FGM/C showed they were risk factors for FGM/C; these variables may be proxy indicators for social norms. A systematic review examining men's attitudes, beliefs and behaviours regarding FGM/C demonstrated mixed perceptions about the practice as some men wished to abandon the practice but others considered it a social obligation.⁷⁴ An enabling environment to support the discontinuation of FGM/C demands enhancing the men's role, whether the husbands, fathers or community leaders, as promoters who can partner to break this social convention.⁷¹ Qualitative studies report that women believe FGM/C is a religious obligation.⁷⁵ ⁷⁶ Narratives and experiences of communities that practise FGM/C suggest that FGM/C is a ritual or tradition that has been a social and cultural norm across generations and is a requirement for marriage.⁷⁶ ⁷⁷

This review found that the majority of studies identified urban status as protective against FGM/C among women. Although some urbanised cities are lagging in achieving gender equality goals, there appears to be an association between urbanisation and women's ability to make strategic life choices.⁷⁸ One reason for this relationship is that urbanisation improves women's educational participation and empowers them economically and politically.⁷⁹ The relationship between residence in urban areas and female schooling may explain how urbanisation contributes to better gender equality and well-being for women.⁷⁸ ⁴³

This systematic review showed that the majority of studies assessing parental education found that it was protective against FGM/C for women and girls. This finding is supported by the literature; Link and Phelan argue that female education is one of the main proxy variables for autonomy and that it plays a role in preventing violent outcomes.⁸⁰ The demonstrated association between education and FGM/C may be a reflection of the effect of education on improving the interpersonal skills of women and girls, their

social status and cultural outlook, and their ability to lead independent lives and oppose gender roles and traditions.⁸¹

There were several factors related to women's status in society that were shown to be risk factors for FGM/C, including low maternal education status, child marriage, being an undocumented migrant, and living in a village with high FGM/C rates. Progress towards gender equality through women's inclusion in the workplace and education may be a pathway to ending FGM/C.⁸² Furthermore, the United Nations General Assembly stated in a resolution that member states should "pursue a comprehensive, culturally sensitive, systematic approach that incorporates a social perspective and is based on human rights and gender equality principles in providing education and training to families, local community leaders and members of all professions relevant to the protection and empowerment of women and girls to increase awareness of and commitment to the elimination of female genital mutilations" (United Nations, 2012; UNFPA, pp. 3–4).⁸³ The pursuit of gender equality, women's empowerment, and elimination of FGM/C is cross-cutting, and requires engagement at all levels of the socio-ecological model to meet the Sustainable Development Goals.

Strengths and limitations

This review used rigorous search strategies and standardised systematic review methodology to ensure the inclusion of all eligible studies and the accurate synthesis of these studies. This review had several limitations; approximately half of the studies had a high risk of bias. In addition, many studies were cross-sectional, so reverse causality cannot be excluded for many determinants in the included studies. Furthermore, there was considerable heterogeneity between studies due to the broad range of study locations, participants and methods to assess and categorise the various determinants.

This review only presented factors associated with FGM/C as presented in the literature and there may be other related factors that were not reported in the included studies. For example, the commercial or economic determinants of FGM/C, where traditional practitioners perform FGM/C for financial reasons, perpetuating the practice in communities.⁸⁴

Recommendations for future research

The present research mainly demonstrates evidence on FGM/C determinants from resource-poor settings, leaving gaps in knowledge related to migrant health in high-income countries. Further work should be completed to understand the effectiveness of policies and interventions that aim to eradicate FGM/C. An evaluation of "grassroots" and community-level interventions or policies will allow an understanding of the barriers and facilitators to implementation, and the

potential to extrapolate these interventions and policies to other communities.

CONCLUSIONS

This review identified factors related to FGM/C, which include lower parental education, religion, rural residence, and family history of FGM/C. Disrupting the intergenerational trauma of FGM/C through education, advocacy, and changing social norms may be potential pathways to eliminating FGM/C. Gender equality, improving women's status in society, and education of girls are cross-cutting Sustainable Development Goals that will improve the health and well-being of women globally. Approaching women's status in society holistically is vital to tackling harmful practices against women.

Correction notice This article has been corrected since it was first published. Under the section about data extraction, the first two sentences have been modified.

Acknowledgements We would like to acknowledge the assistance of Ms. Sandra Kahwaji and Ms. Jana Abu Ayash for their help in the title and abstract screening of articles. We thank Dr. Sawsan Abdulrahim for insightful comments and edits on preliminary drafts.

Contributors SM conceived the study and CAkl and CAkik contributed to the study design. SM and LF wrote the protocol with contributions from CAkl and CAkik. ZD completed the literature search. LF and ZD selected the studies and extracted relevant data. ZD analysed the data and wrote the first draft of the paper. SM supervised ZD. SM, CAkl, CAkik, UA and ZD revised drafts and approved the final manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval This study does not involve human participants.

Provenance and peer review Not commissioned; externally peer reviewed.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Zeinab El-Dirani <http://orcid.org/0000-0002-3610-3816>
Stephen J McCall <http://orcid.org/0000-0003-0078-7010>

REFERENCES

- World Health Organization (WHO). Female genital mutilation: a joint WHO/UNICEF/UNFPA statement, 1997. Available: <https://apps.who.int/iris/handle/10665/41903> [Accessed 19 Jan 2022].
- United Nations (UN). Transforming our world: the 2030 agenda for sustainable development, 2015. Available: <https://sdgs.un.org/2030agenda> [Accessed 19 Jan 2022].
- World Health Organization (WHO). Care of women and girls living with female genital mutilation: a clinical handbook, 2018. Available: <https://apps.who.int/iris/rest/bitstreams/1136324/retrieve> [Accessed 19 Jan 2022].
- Gayle C, Rymer J. Female genital mutilation and pregnancy: associated risks. *Br J Nurs* 2016;25:978–83.
- Kandala N-B, Ezejimofor MC, Uthman OA, *et al*. Secular trends in the prevalence of female genital mutilation/cutting among girls: a systematic analysis. *BMJ Glob Health* 2018;3:e000549.
- UNICEF Somalia and Somaliland Ministry of Planning and National Development. Somaliland multiple indicator cluster survey 2011, final report, 2014. Available: <https://mics.unicef.org/> [Accessed 19 Jan 2022].
- Martinelli M, Ollé-Goig JE. Female genital mutilation in Djibouti. *Afr Health Sci* 2012;12:412–5.
- Guinea National Institute of Statistics. Multiple indicator cluster survey (MICS, 2016), final report, 2017. Available: https://mics-surveys-prod.s3.amazonaws.com/MICS5/West%20and%20Central%20Africa/Guinea/2016/Final/Guinea%202016%20MICS_French.pdf [Accessed 19 Jan 2022].
- Johnsdotter S, Mestre R. *Female genital mutilation in Europe: an analysis of court cases*. European Commission-Directorate-General for Justice, 2015.
- Gibson-Helm ME, Teede HJ, Cheng I-H, *et al*. Maternal health and pregnancy outcomes comparing migrant women born in humanitarian and nonhumanitarian source countries: a retrospective, observational study. *Birth* 2015;42:116–24.
- Yoder PS, Wang S. *Female genital cutting: the interpretation of recent DHS data*. ICF International, 2013.
- Evidence Partners. DistillerSR, 2017. Available: <https://www.evidencepartners.com/products/distillersr-systematic-review-software18> [Accessed Jan 2022].
- Moher D, Liberati A, Tetzlaff J, *et al*. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Int J Surg* 2010;8:336–41.
- Farouki L, Abdulrahim S, Akl C. The global prevalence, distribution and determinants of female genital mutilation: a protocol for a systematic review and meta-analysis. *Open Science Framework*, 2020. Available: <https://osf.io/ema9j/> [Accessed 19 Jan 2022].
- CLARITY Group. Risk of bias instrument for cross-sectional surveys of attitudes and practices. Available: <https://www.evidencepartners.com/wp-content/uploads/2021/03/Risk-of-Bias-Instrument-for-Cross-Sectional-Surveys-of-Attitudes-and-Practices-DistillerSR.pdf> [Accessed 19 Jan 2022].
- CLARITY Group. Tool to assess risk of bias in case-control studies. Available: <https://www.evidencepartners.com/wp-content/uploads/2021/03/Tool-to-Assess-Risk-of-Bias-in-Case-Control-Studies-DistillerSR.pdf> [Accessed 19 Jan 2022].
- Alosaimi AN, Essén B, Riitta L, *et al*. Factors associated with female genital cutting in Yemen and its policy implications. *Midwifery* 2019;74:99–106.
- Yirga WS, Kassa NA, Gebremichael MW, *et al*. Female genital mutilation: prevalence, perceptions and effect on women's health in Kersa district of Ethiopia. *Int J Womens Health* 2012;4:45.
- Bjälkander O, Grant DS, Berggren V, *et al*. Female genital mutilation in Sierra Leone: forms, reliability of reported

- status, and accuracy of related demographic and health survey questions. *Obstet Gynecol Int* 2013;2013:1–14.
- 20 Ali HAAEW, Arafa AE, El Fattah Abd Allah Shehata NA, *et al.* Prevalence of female circumcision among young women in Beni-Suef, Egypt: a cross-sectional study. *J Pediatr Adolesc Gynecol* 2018;31:571–4.
 - 21 Zayed AA, Ali AA. Abusing female children by circumcision is continued in Egypt. *J Forensic Leg Med* 2012;19:196–200.
 - 22 Greis A, Bärnighausen T, Bountogo M, *et al.* Attitudes towards female genital cutting among adolescents in rural Burkina Faso: a multilevel analysis. *Trop Med Int Health* 2020;25:119–31.
 - 23 Tamire M, Molla M. Prevalence and belief in the continuation of female genital cutting among high school girls: a cross-sectional study in Hadiya zone, Southern Ethiopia. *BMC Public Health* 2013;13:1120.
 - 24 Mudege NN, Egoni T, Beguy D, *et al.* The determinants of female circumcision among adolescents from communities that practice female circumcision in two Nairobi informal settlements. *Health Sociology Review* 2012;21:242–50.
 - 25 Shay TZ, Haidar J, Kogi-Makau W. Magnitude of and driving factors for female genital cutting in schoolgirls in Addis Ababa, Ethiopia: a cross-sectional study. *South African Journal of Child Health* 2010;4:78–82.
 - 26 Saleem RA, Othman N, Fattah FH, *et al.* Female genital mutilation in Iraqi Kurdistan: description and associated factors. *Women Health* 2013;53:537–51.
 - 27 Akinsulure-Smith AM. Exploring female genital cutting among West African immigrants. *J Immigr Minor Health* 2014;16:559–61.
 - 28 Akinsulure-Smith AM, Chu T. Exploring female genital cutting among survivors of torture. *J Immigr Minor Health* 2017;19:769–73.
 - 29 Chu T, Akinsulure-Smith AM. Health outcomes and attitudes toward female genital cutting in a community-based sample of West African immigrant women from high-prevalence countries in New York City. *J Aggress Maltreat Trauma* 2016;25:63–83.
 - 30 Koschollek C, Kuehne A, Müllerschön J, *et al.* Knowledge, information needs and behavior regarding HIV and sexually transmitted infections among migrants from sub-Saharan Africa living in Germany: results of a participatory health research survey. *PLoS One* 2020;15:e0227178.
 - 31 Koukkula M, Keskimäki I, Koponen P, *et al.* Female genital mutilation/cutting among women of Somali and Kurdish origin in Finland. *Birth* 2016;43:240–6.
 - 32 Mbanya VN, Gele AA, Diaz E, *et al.* Health care-seeking patterns for female genital mutilation/cutting among young Somalis in Norway. *BMC Public Health* 2018;18:517.
 - 33 Anikwe CC, Ejikeme BN, Obiechina NJ, *et al.* Female genital mutilation and obstetric outcome: a cross-sectional comparative study in a tertiary hospital in Abakaliki South East Nigeria. *Eur J Obstet Gynecol Reprod Biol* 2019;1:100005.
 - 34 Njoku CO, Emechebe CI, Njoku AN, *et al.* Obstetric outcomes of parturients with female genital mutilation in a tertiary hospital in Nigeria. *Research Journal of Obstetrics & Gynecology* 2020;13:8–13.
 - 35 Besera G, Roess A. The relationship between female genital cutting and women's autonomy in Eritrea. *Int J Gynaecol Obstet* 2014;126:235–9.
 - 36 Chikhungu LC, Madise NJ. Trends and protective factors of female genital mutilation in Burkina Faso: 1999 to 2010. *Int J Equity Health* 2015;14:42.
 - 37 Elduma AH. Female genital mutilation in Sudan. *Open Access Maced J Med Sci* 2018;6:430–4.
 - 38 Gajaa M, Wakgari N, Kebede Y, *et al.* Prevalence and associated factors of circumcision among daughters of reproductive aged women in the Hababo Guduru district, Western Ethiopia: a cross-sectional study. *BMC Womens Health* 2016;16:42.
 - 39 Kandala N-B, Nnanatu CC, Atilola G, *et al.* A spatial analysis of the prevalence of female genital mutilation/cutting among 0–14-year-old girls in Kenya. *Int J Environ Res Public Health* 2019;16:4155.
 - 40 Kandala N-B, Shell-Duncan B. Trends in female genital mutilation/cutting in Senegal: what can we learn from successive household surveys in sub-Saharan African countries? *Int J Equity Health* 2019;18:25.
 - 41 Ojo TO, Ijadunola MY. Sociodemographic factors associated with female genital cutting among women of reproductive age in Nigeria. *Eur J Contracept Reprod Health Care* 2017;22:274–9.
 - 42 Abdel-Aleem MA, Elkady MM, Hilmy YA. The relationship between female genital cutting and sexual problems experienced in the first two months of marriage. *Int J Gynaecol Obstet* 2016;132:305–8.
 - 43 Abolfotouh SM, Ebrahim AZ, Abolfotouh MA. Awareness and predictors of female genital mutilation/cutting among young health advocates. *Int J Womens Health* 2015;7:259.
 - 44 Ali AAA, Okud A, Mohammed AA, *et al.* Prevalence of and factors affecting female genital mutilation among schoolgirls in eastern Sudan. *Int J Gynaecol Obstet* 2013;120:288–9.
 - 45 Beller J, Kröger C. Differential effects from aspects of religion on female genital mutilation/cutting. *Psycholog Relig Spiritual* 2018;13:381–9.
 - 46 Garba ID, Muhammed Z, Abubakar IS, *et al.* Prevalence of female genital mutilation among female infants in Kano, Northern Nigeria. *Arch Gynecol Obstet* 2012;286:423–8.
 - 47 Im H, Swan LET, Heaton L. Polyvictimization and mental health consequences of female genital mutilation/circumcision (FGM/C) among Somali refugees in Kenya. *Women Health* 2020;60:636–51.
 - 48 Minsart A-F, N'guyen T-S, Ali Hadji R, *et al.* Maternal infibulation and obstetrical outcome in Djibouti. *J Matern Fetal Neonatal Med* 2015;28:1741–6.
 - 49 Mohammed GF, Hassan MM, Eyada MM. Female genital mutilation/cutting: will it continue? *J Sex Med* 2014;11:2756–63.
 - 50 Nonterah EA, Kanmiki EW, Agorinya IA, *et al.* Prevalence and adverse obstetric outcomes of female genital mutilation among women in rural Northern Ghana. *Eur J Public Health* 2020;30:601–7.
 - 51 Rasheed SM, Abd-Ellah AH, Yousef FM. Female genital mutilation in upper Egypt in the new millennium. *Int J Gynaecol Obstet* 2011;114:47–50.
 - 52 Yasin BA, Al-Tawil NG, Shabila NP, *et al.* Female genital mutilation among Iraqi Kurdish women: a cross-sectional study from Erbil City. *BMC Public Health* 2013;13:809.
 - 53 Abdulah DM, Sedo BA, Dawson A. Female genital mutilation in rural regions of Iraqi Kurdistan: a cross-sectional study. *Public Health Rep* 2019;134:514–21.
 - 54 Ahmed MR, Shaaban MM, Meky HK, *et al.* Psychological impact of female genital mutilation among adolescent Egyptian girls: a cross-sectional study. *Eur J Contracept Reprod Health Care* 2017;22:280–5.

- 55 Andualem M. Determinants of female genital mutilation practices in East Gojjam zone, Western Amhara, Ethiopia. *Ethiop Med J* 2016;54:109–16.
- 56 Arafa AE, Elbahrawe RS, Shawky SM, *et al.* Epidemiological and gynecological correlates with female genital mutilation among Beni-Suef university students; cross sectional study. *Middle East Fertil Soc J* 2018;23:184–8.
- 57 Ashimi AO, Amole TG, Iliyasu Z. Prevalence and predictors of female genital mutilation among infants in a semi urban community in northern Nigeria. *Sex Reprod Healthc* 2015;6:243–8.
- 58 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.
- 59 Boyle EH, Svec J. Intergenerational transmission of female genital cutting: community and marriage dynamics. *J Marriage Fam* 2019;81:631–47.
- 60 Dehghankhalili M, Fallahi S, Mahmudi F, *et al.* Epidemiology, regional characteristics, knowledge, and attitude toward female genital mutilation/cutting in southern Iran. *J Sex Med* 2015;12:1577–83.
- 61 Gebremariam K, Assefa D, Weldegebreal F. Prevalence and associated factors of female genital cutting among young adult females in Jijiga district, eastern Ethiopia: a cross-sectional mixed study. *Int J Womens Health* 2016;8:357–65.
- 62 Ifeanyichukwu OA, Oluwaseyi A, Adetunji L. Female genital mutilation: attitude and practices among women in Okada community, Edo state. *Journal of Medicine and Biomedical Research* 2015;14:138–50.
- 63 Iliyasu Z, Abubakar IS, Galadanci HS, *et al.* Predictors of female genital cutting among university students in northern Nigeria. *J Obstet Gynaecol* 2012;32:387–92.
- 64 Milaat WA, Ibrahim NK, Albar HM. Reproductive health profile and circumcision of females in the Hali semi-urban region, Saudi Arabia: a community-based cross-sectional survey. *Ann Saudi Med* 2018;38:81–9.
- 65 Mitike G, Deressa W. Prevalence and associated factors of female genital mutilation among Somali refugees in eastern Ethiopia: a cross-sectional study. *BMC Public Health* 2009;9:264.
- 66 Oljira T, Assefa N, Dessie Y. Female genital mutilation among mothers and daughters in Harar, eastern Ethiopia. *Int J Gynaecol Obstet* 2016;135:304–9.
- 67 Rouzi AA, Berg RC, Alamoudi R, *et al.* Survey on female genital mutilation/cutting in Jeddah, Saudi Arabia. *BMJ Open* 2019;9:e024684–e84.
- 68 Sakeah E, Debpuur C, Oduro AR, *et al.* Prevalence and factors associated with female genital mutilation among women of reproductive age in the Bawku municipality and Pusiga district of northern Ghana. *BMC Womens Health* 2018;18:150.
- 69 Sylla M, Léonie F, Diakité F. 1. Aspects épidémiologiques, cliniques, socio-culturels et économiques des mutilations génitales féminines dans le district de Bamako au Mali. *J Obstet Gynaecol Can* 2020;42:e15.
- 70 World Health Organization (WHO). Eliminating female genital mutilation: an Interagency statement-OHCHR, UNAIDS, UNDP, UNECA, UNESCO, UNFPA, UNHCR, UNICEF, UNIFEM, WHO, 2008. Available: <https://www.who.int/publications-detail-redirect/9789241596442> [Accessed 19 Jan 2022].
- 71 UNICEF Innocenti Research Centre. Changing a harmful social convention: female genital mutilation/cutting, 2008. Available: https://www.unicef-irc.org/publications/pdf/fgm_eng.pdf [Accessed 19 Jan 2022].
- 72 World Health Organization (WHO). The economic cost of female genital mutilation, 2020. Available: <https://www.who.int/news/item/06-02-2020-economic-cost-of-female-genital-mutilation> [Accessed 19 Jan 2022].
- 73 Sood S, Kostizak K, Lapsansky C, *et al.* ACT: an evidence-based macro framework to examine how communication approaches can change social norms around female genital mutilation. *Front Commun (Lausanne)* 2020;5:29.
- 74 Varol N, Turkmani S, Black K, *et al.* The role of men in abandonment of female genital mutilation: a systematic review. *BMC Public Health* 2015;15:1–14.
- 75 Ahmed HM, Kareem MS, Shabila NP, *et al.* Religious leaders' position toward female genital cutting and their perspectives on the relationship between the Islamic religion and this practice. *Women Health* 2019;59:854–66.
- 76 Rashid A, Iguchi Y. Female genital cutting in Malaysia: a mixed-methods study. *BMJ Open* 2019;9:e025078.
- 77 Ahmed HM, Shabu SA, Shabila NP. A qualitative assessment of women's perspectives and experience of female genital mutilation in Iraqi Kurdistan Region. *BMC Women's Health* 2019;19:1–12.
- 78 Çınar K. Women and the city: female empowerment in the world, 1960–2014. *Turkish Studies* 2019;20:177–99.
- 79 Cinar K, Ugur-Cinar M. What the city has to offer: urbanization and women's empowerment in Turkey. *Politics & Gender* 2018;14:235–63.
- 80 Link BG, Phelan J. Social conditions as fundamental causes of disease. *J Health Soc Behav* 1995;Spec No:80–94.
- 81 Van Rossem R, 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;15:1–13.
- 82 Agboli A, Botbol M, O'Neill S, *et al.* Transforming vulnerability into power: exploring empowerment among women with female genital mutilation/cutting (FGM/C) in the context of migration in Belgium. *J Human Dev Capabil* 2020;21:49–62.
- 83 United Nations General Assembly. Intensifying global efforts for the elimination of female genital mutilations, 2012. Available: https://www.unfpa.org/sites/default/files/resource-pdf/67th_UNGA-Resolution_adopted_on_FGM_0.pdf [Accessed 19 Jan 2022].
- 84 UN Women. Traditional practitioners embark on alternative economic livelihood programs in Liberia, 2021. Available: <https://africa.unwomen.org/en/news-and-events/stories/2021/02/in-the-words-of-economic-programs-fgm-liberia> [Accessed 19 Jan 2022].