1 **Title:** The global prevalence of female genital mutilation/cutting: A systematic review and meta-

2 analysis of national, regional, facility and school-based studies.

3

4 **Short title:** Global prevalence of female genital mutilation/cutting

5

6 **Authors:** Leen Farouki BA[1], Zeinab El Dirani MSc[1], Sawsan Abdulrahim PhD[2], Christelle Akl

7 MS[1], Chaza Akik DrPH[1], Stephen J McCall DPhil[1]

8

9 **Affiliations:**

10 1. Center for Research on Population and Health, Faculty of Health Sciences, American

11   University of Beirut, Lebanon

12 2. Department of Health Promotion and Community Health, Faculty of Health Sciences,

13 American University of Beirut, Lebanon.

14

15 **Corresponding Author:** Stephen J McCall

16 Email: sm227@aub.edu.lb

17 Telephone: +961 1 350 000 ext. 4563

18

19

20

21

22

23

24

25

26

27

28

29   **Abstract (459/500 words)**
30
31   **Background:** Female Genital Mutilation/Cutting (FGM/C) is a non-medical procedure entailing

32   the modification of the external female genitalia. A description of the prevalence and distribution

33   of FGM/C allows the tracking of progress towards ending FGM/C by 2030 (Sustainable

34   Development Goal (SDG) Target 5.3). This systematic review aimed to examine FGM/C

35   prevalence and types, by World Health Organization (WHO) region and country.

36   **Methods:** A systematic search using Medical Subject Headings (MeSH) and keywords from

37   2009 to March 24, 2022 was undertaken in MEDLINE, PubMED, PsycINFO, Web of Science,

38   and Embase to identify studies presenting FGM/C prevalence. Abstract and full-text screening,

39   quality assessment, and data extraction were undertaken by two reviewers. Only nationally

40   representative studies were included in the meta-analysis. Pooled FGM/C prevalence was

41   estimated by random-effects meta-analysis using generalised linear mixed models (GLMM).

42   FGM/C prevalence with 95% confidence intervals (CI), prediction intervals (PI) and FGM/C

43   type were presented separately by women aged 15-49 years and girls aged 0-14 years.

44   **Findings**: 161 studies met the inclusion criteria and 28 were included in the meta-analysis, of

45   which 22 were from the WHO African region (AFR), 5 from the Eastern Mediterranean region

46   (EMR), and 1 from the South-East Asia (SEAR) region. These studies included data from

47   397,683 women across 28 countries and 283,437 girls across 23 countries; the pooled prevalence

48   estimate of FGM/C amongst women aged 15-49 years was 38.3% (95% CI: 20.8–59.5%;

49   PI:0.48–98.8%), and 7.25% (95% CI: 3.1–16.0%; PI: 0.1-88.9%) amongst girls aged 0-14 years.

50   Amongst included countries, this gave a total estimated prevalence of 86,080,915 women (95%

51   CI: 46,736,701–133,693,929) and 11,982,031 girls with FGM/C (95% CI: 5,123,351–

52   26,476,156). Somalia had the highest FGM/C prevalence amongst women (99.2%) and Mali had

53   the highest amongst girls (72.7%). The most common type of FGM/C amongst women was

54   "flesh removed" (Type I or II) in 19 countries, and "not sewn closed" (Type I, II, or IV) amongst

55   girls in 9 countries. Among repeated nationally representative studies, FGM/C decreased for

56   women and girls in 23 and 25 countries respectively, although in several countries there was a

57   minor decrease (0-3%) or increase in prevalence. The main limitation of the study methodology

58   is that estimates were based on the available published data, which may not reflect the actual

59   global prevalence of FGM/C.

60 **Discussion:** In this study, we observed large variation in FGM/C prevalence between countries,

61 and the prevalence appears to be declining in many countries, which is encouraging as it

62 minimises physical and physiological harm for a future generation of women. This prevalence

63 estimate is lower than the actual global prevalence of FGM/C due to data gaps, non-comparable

64 denominators, and unavailable surveys. Yet, considerable policy and community-level

65 interventions are required in many countries to meet the SDG target 5.3.

66 **Funding:** None

67 **Registration:** CRD42020186937

68

69   **Author Summary**

70   **Why was this study done?**

71   • FGM/C is an extreme form of gender inequality that violates women's and girls' human
72   rights, and the practice has lifelong health and economic consequences for women and
73   girls.
74   • Previous studies on prevalence of FGM/C have used repeated nationally representative
75   cross-sectional studies and found that FGM/C is decreasing in many countries.
76   • This study aimed to provide a baseline prevalence estimate and to understand the data
77   gaps in prevalence required for tracking progress towards the Sustainable Development
78   Goal (SDG) Target 5.3.

79   **What did the researchers do and find?**

80   • This was a systematic review and meta-analysis of all available studies on FGM/C and it
81   provided a thorough overview of studies published on FGM/C prevalence at a national,
82   sub-regional, school, facility, and community level.
83   • Approximately 100 million girls and women of reproductive age have experienced
84   FGM/C across 28 countries in three WHO regions, with a prevalence of 38% in women
85   and 7% among girls.
86   • There were large differences between regions and countries; where some countries
87   practiced FGM/C universally, and FGM/C appeared to be decreasing in 23 countries for
88   women and 25 countries for girls.

89   **What do these findings mean?**

90   • Current findings imply that progress towards SDG 5.3 is attainable in some countries, but
91   much work is required in others, including Egypt, Somalia, Sudan, Indonesia, Guinea,
92   and Mali.
93   • Evaluation of structural or community level policies and interventions in countries that
94   had a decline in FGM/C will be beneficial for countries that have a high prevalence of
95   FGM/C.

96   • The prevalence estimate of this study is accurate of the included countries but is an

97   underestimate of the global prevalence due to gaps in available data across the world,

98   which are important to resolve to understand actual progress towards SDG 5.3.

99

100

101

102

103

Introduction

Female Genital Mutilation/Cutting (FGM/C), also referred to as female circumcision, is a non-medical procedure that entails the total or partial removal of external female genitalia and other injuries to the female genital organs [1]. The United Nations Sustainable Development Goal (SDG) target 5.3 on gender equality refers to FGM/C as a harmful traditional practice and calls for ending it by 2030.

While the exact global prevalence of FGM/C is unknown, estimates of FGM/C range from 100-140 million women and girls in African region and the Middle East [2, 3], while UNICEF estimates the global prevalence to be over 200 million women and girls living with FGM/C [1-4]. Nationally representative data show that there is a decline in the prevalence of FMG/C but this is not universal across countries [1, 5, 6]. FGM/C persists due to religious, social, and cultural factors [7]. It is commonly believed to create better marriage prospects because it associates with morality, hygiene, and aesthetics; FGM/C is also believed to curb sexual urges and maintain virginity [8]. However, the procedure has no health benefits; it has resulted in negative health outcomes, including menstrual difficulties, infertility, urinary problems, mental health problems, pregnancy and labour complications severe pain, risk of contracting infections, septicaemia, and even death [9-11]. FGM/C is also an economic burden throughout the life course for girls and women [12].

FGM/C is most often performed on girls between infancy and adolescence, and has been classified into four types [13]. Type I (clitoridectomy) involves the partial or total removal of the prepuce and/or the clitoral gland. Type II involves the partial or total removal of the labia minora and clitoral glans without the excision of the labia majora. Type III (infibulation) involves narrowing the vaginal canal by modifying the labia majora and minora and may also include the removal of the clitoral glans. Type IV involves any other non-medical, harmful procedure, such as cauterization, pricking, and scraping [14]. Risks defer by type; the most severe type, Type III, has the more serious obstetric risks of FGM/C including infant resuscitation, stillbirth, and neonatal death; while Types I and II carry risks of caesarean section or postpartum bleeding [15].

An important aspect of the SDGs is to track progress on ending harmful traditional practices, such as FGM/C. However, to our knowledge, there is no comprehensive review in the literature

133   that provides estimates of FGM/C globally, by World Health Organization (WHO) region, or

134   specific countries, which can be used to track improvements towards SDG 5.3. A review of the

135   prevalence of FGM/C will support efforts to understand the global burden of FGM/C and inform

136   adequate prevention and intervention efforts, and local and international policies. A review of the

137   types of FGM/C will contribute similarly by tracking the prevalence of the severity of the

138   procedure. This systematic review and meta-analysis aimed to examine (1) the prevalence of

139   FGM/C and (2) the proportion of the different types of FGM/C, amongst girls aged 0-14 years

140   and women aged 15-49 years old by country and WHO region.

141

Methods

Search strategy and study selection. In this systematic review and meta-analysis of FGM/C prevalence, separate searches were conducted using MEDLINE, PubMED, PsycINFO, Web of Science, and Embase. Hand searches of the grey literature were conducted through searches of reports from international non-governmental organizations, including UNFPA and UNICEF amongst others, and other Google searches. Hand searches of the bibliographies of relevant systematic reviews were also conducted. Together, these databases provide international and interdisciplinary publications. The search strategy (S1 Methods and Results, S1 Table) was adapted to the format of each database. To present up-to-date data that can be used as a baseline to monitor progress on SDG 5.3 over the last decade, the search was limited to include publications from 2009 until 2020. The search was updated to include publications from 2009 until 2022. The last search in all databases was conducted on March 24th, 2022. For nationally representative studies, the hand searches were conducted to include studies prior to 2009 in a post-hoc analysis to present FGM/C prevalence across time. The MeSH term for FGM/C was used when possible; otherwise, keywords were used, including "Female Genital Mutilation," "Female Genital Alteration," "Female Circumcision," and "Female Genital Cutting". No language restrictions were imposed. The references were imported from each database into EndNote then into systematic review software DistillerSR and duplicates were removed [16].

Study protocol, registration, and reporting. The reporting of this study was based on the Preferred Reporting Items for Systematic Review (PRISMA) reporting guidelines (S2 PRISMA Checklist) [17, 18]. The prospectively written study protocol is (S3 Study Protocol) available at: https://osf.io/h54bu/ [19] and was registered with PROSPERO, number CRD42020186937.

Inclusion and exclusion criteria. This systematic review and meta-analysis were part of a larger project on FGM/C prevalence and its determinants [7, 19]. Cohort or cross-sectional studies that reported on FGM/C prevalence at the national level, using representative samples or population-based methods, were included in the systematic review and meta-analysis. Sub-regional, facility, community and school-based studies and studies that used non population-based methods or non-probability sampling designs, including cross-sectional, cohort designs, were included in the systematic review but not in the meta-analysis. Furthermore, case-series in migrant populations

171   outside of countries that practice FGM/C were included to understand the scope of the literature

172   on FGM/C in these countries.

173   Studies were excluded if they (i) only reported on health outcomes of FGM/C, the attitudes and

174   knowledge of healthcare providers, economic effects, or perceptions of FGM/C, (ii) only used

175   qualitative methods, (iii) were systematic reviews (except for referencing), or (iv) were policy

176   reports, conference proceedings or letters to the editor. If numerous journal articles used the

177   same data source, e.g. secondary data analysis of international surveys, only the original report

178   was included. Other than nationally representative studies, if the same data source completed

179   multiple studies in a given country across time, then the most recent was included. The

180   supplementary material contains further details on the included and excluded studies (S1

181   Methods and Results, S1 Text).

182   **Study Screening.** Titles and abstracts were screened independently by two reviewers. Articles

183   selected for full-text review were also screened by two reviewers, independently and in

184   duplicates. The reasons for exclusion at both the abstract and full-text stages were recorded.

185   Disagreements between the two reviewers were resolved by discussion and consulting a third

186   reviewer who verified the eligibility of all included studies. The supplementary material contains

187   further details on the screening process (S1 Methods and Results, S2 Table).

188   **Data extraction and quality assessment.** Data were extracted from included articles using a

189   structured data extraction form, uploaded into DistillerSR. Data were extracted by one reviewer

190   and verified by a second reviewer; disagreements were resolved by a third reviewer. Data

191   included in the final tables were verified against the original publication by a further reviewer.

192   Items extracted from studies included study characteristics, sampling methods, design, host

193   country and country of origin, ethnicity, age, age at FGM/C, location of procedure, performer of

194   FGM/C, FGM/C prevalence, and proportion of the different FGM/C types. The FGM/C

195   prevalence in each included study was extracted as a proportion or calculated from the numbers

196   presented. All data items were extracted from the most recent nationally representative studies

197   (e.g. MICS or DHS), while only prevalence estimates were extracted from the older nationally

198   representative studies for the post-hoc analysis. Studies were assessed for risk of bias

199   independently by two reviewers using an adapted tool by Hoy and colleagues, which is specific

200 to prevalence studies [20]. This tool includes nine items that collectively assess the selection

201 bias, representativeness of the sample, validity of the tool, and appropriateness of the estimate.

202 Each item was scored as low or high risk of bias, and each paper was given an overall score rated

203 as low, moderate, or high risk of bias.

Data Analysis

205 Because the literature fell into certain categories, namely nationally representative, sub-regional,

206 and non-probability samples, data in the present study were grouped similarly. Prevalence

207 estimates from the different studies were grouped by country, WHO region and study design.

208 Pooled estimates of FGM/C prevalence were only presented from studies with representative

209 samples or population-based methods at a national level, and the most recent survey was used in

210 the meta-analysis. Prevalence estimates were presented separately for women aged 15-49 years

211 old and girls aged 0-14 years old as most studies collected data for women and girls separately as

212 defined by these age groups; and it was considered inappropriate to pool these groups together

213 due to a cohort effect [5, 21]. Studies that estimated FGM/C among girls using the number of

214 women with at least 1 daughter with FGM/C were excluded from the meta-analysis because this

215 does not provide an estimate of prevalence among all girls aged 0-14 years old. The denominator

216 of FGM/C type was the total number of women and girls with FGM/C, respectively. In addition,

217 a post-hoc summary of prevalence estimates of FGM/C for each country was presented across

218 time for both women and girls.

219 For the meta-analysis, heterogeneity between studies is usually assessed using the I^2 statistic

220 [22]. Although high values of I^2 are common in meta-analysis for prevalence studies, prediction

221 intervals are recommended to be presented as a measure of heterogeneity [23]. The prediction

222 interval is the range where a proportion from a future study would be expected to be located

223 within if this study was randomly selected from the same group of studies included in the meta-

224 analysis [24]. τ^2 values were also presented as a measure of the variance of effect sizes amongst

225 studies [25]. Using data extracted from survey reports, a random-effects meta-analysis was

226 conducted to produce a pooled prevalence across all nationally representative studies and across

227 each WHO region. The random-effects meta-analysis of the pooled prevalence, 95% confidence

228 intervals (CI) and prediction intervals (PI) were estimated using Generalized Linear Mixed

229 Models (GLMM) [26] through the 'metaprop' command within the Meta package, version 4.15-

10

230   1 [27]. Funnel plots were constructed to inspect visual asymmetry using the funnelR package,

231   version 0.1.0, which was developed for proportion data (S1 Figure and S2 Figure) [28]. To

232   provide the total number of girls (0-14 years old) and women (15-49 years old) with FGM/C, the

233   pooled prevalence estimate was extrapolated against the age-specific population total in 2020,

234   which only included countries that were included in the meta-analysis, using the UN Population

235   Division [29]. All statistical analyses were conducted using R version 4.1.2.

Protocol amendments

237   The protocol was amended to include studies in any language and to specify the disaggregation

238   by age group; available at: https://osf.io/h54bu/ (S3 Study Protocol). Other than studies involving

239   migrants, case series and case-control studies were excluded as prevalence cannot be calculated.

240   A data driven analysis was conducted to present prevalence of FMG/C across time from national

241   surveys. A GLMM meta-analysis was used rather than a Freeman-Tukey transformation due to

242   the limitations of the latter approach [26]. We also provided prediction intervals due to recent

243   methodological recommendations and we present total number of women and girls with FGM/C

244   to allow comparison with other global estimates [23].

Ethical approval and role of the funding source

246   This was a systematic review of published studies, so no ethical approval was required. There

247   was no funding source for this study.

248

Results

249

250 Out of 2913 records retrieved from database and hand searches, 417 publications were assessed

251 under full-text review. Of these, a total of 161 were included in the systematic review: 28

252 nationally representative studies were included in the meta-analysis of the prevalence of FGM/C

253 and two were included in the systematic review but not in the meta-analysis; 33 sub-regional

254 studies; and 98 non population-based studies including 44 on migrant populations (Figure 1).

255 The Indonesia RISKESDAS [30] was not included in the meta-analysis because it did not

256 provide the sample size, and the Pew Research Center survey [31], Eritrea Population and Health

257 Survey [32] and Yemen DHS survey [33] were not included in the meta-analysis of FGM/C

258 prevalence of girls as these surveys had non-comparable denominators.

259 Nationally representative studies

260 Of the 30 nationally representative studies, 17 used data from Demographic and Health Surveys

261 (DHS), 10 use data from Multiple Indicator Cluster Surveys (MICS), and three used other

262 population-based surveys (S4 Results, S4 Table). Furthermore, 22 represent the African Region

263 (AFR) [32, 34-54], five represent the Eastern Mediterranean Region (EMR) [33, 55-58], two

264 represent the South-East Asian Region (SEAR) [30, 59], and one represented both EMR and

265 AFR [31]. All national studies reported FGM/C prevalence among the total number of women

266 and girls in surveyed households, except surveys from Liberia (reported on women who have

267 heard of FGM/C) [45], Niger [49], and Uganda [54] that reported only on women, and surveys

268 from Yemen [33], Eritrea [32] and Pew Research Center survey [31] which asked women

269 whether at least one of their daughters had FGM/C. Apart from that of the Pew Research Center,

270 all studies had a low risk of bias and used a cross-sectional design with multi-stage cluster

271 sampling. The Pew Research Center survey had a moderate risk of bias, a cross-sectional design,

272 and used stratified random sampling [31].

273 The 28 nationally representative studies included in the meta-analysis provided data on women

274 in 28 countries and data on girls in 23 countries. Out of a total of 397,683 women aged 15-49

275 years in 28 countries, 163,415 women had FGM/C representing a pooled prevalence of 38.3%

276 (CI: 20.8-59.5%; PI: 0.5%-98.8%; τ^2=5.4) (Table 1 & Figure 2). Prevalence estimates varied

277 considerably by country and ranged from 99.2% in Somalia [58] to 0.3% in Uganda [54]. Out of

278   a total of 283,437 girls aged 0-14 years in 23 countries, 46,713 girls had FGM/C, and this gave a

279   pooled prevalence of 7.3% (95% CI: 3.1-16.0%; PI: 0.1-88.9%; τ^2=4.8). The country level

280   prevalence ranged between 72.7% in Mali [46] and 0.1% in Ghana [41] (Table 1 & Figure 3).

281   Amongst included countries, the total estimated prevalence was 86,080,915 women (95%CI:

282   46,736,701–133,693,929) and 11,982,031 girls with FGM/C (95% CI: 5,123,351–26,476,156)

283   (Table 1).

284   Within AFR, the prevalence amongst women was 32.0% (95% CI: 16.2-53.5%; PI: 0.5-97.8%;

285   τ^2=4.6) while amongst girls, it was 7.1% (95% CI: 2.7-17.8%; PI: 0.1-90.9%; τ^2=5.0). This

286   provides a regional estimate of 53,533,504 (95% CI: 28,096,309 – 89,406,470) women with

287   FGM/C and 9,193,035 (95% CI: 3,424,856 – 22,905,335) girls with FGM/C. Within EMR, the

288   prevalence amongst women was 73.7% (95% CI: 21.0-96.7%; PI: 0.02-1%; τ^2=7.2), while

289   amongst girls it was 12.0% (95% CI: 2.1-46.7%; PI: 0-99.9%; τ^2=3.6). This provides a EMR

290   regional estimate of 42,249,544 (95% CI: 12,041,808 – 56,034,547) women with FGM/C and

291   4,382,987 (95% CI: 762,100 – 17,014,158) girls with FGM/C.

292   Among available nationally representative surveys that ranged between 1994 and 2020, most

293   countries showed a decline in the prevalence of FGM/C across repeated cross-sections of women

294   (23 countries) and girls (25 countries) (Table 2). In addition, among repeated cross-sections of

295   women, 7 countries showed a minor decrease in prevalence (0-3%) and three countries showed

296   an increase in the prevalence of FGM/C. In particular, there was an increase from 97.9% to

297   99.2% in Somalia (2006 to 2020), from 71.6% to 75.8% in Burkina Faso (1998-99 to 2010), and

298   from 44.5% to 52.1% in Guinea-Bissau (2006 to 2018-19). For repeated cross-sections of girls, 5

299   countries had a minor decrease in prevalence (0-3%) and two countries had an increase

300   (Djibouti: 48.5% in 2006, to 58% in 2010; and Cameroon: 0.7% in 2004, to 1% in 2010). The

301   largest decline was in Central African Republic (43.4% in 1994-95, to 21.6% in 2018-19) among

302   repeated cross-sections of women; and in Ethiopia from 51.9% in 2000 to 15.7% in 2016, which

303   was among women who reported having at least one daughter who had FGM/C.

304   Twenty-three of the 28 national reports recorded FGM/C type for women (Table 3). In MICS

305   and DHS Type I and II were described as "cut with flesh removed", Type III was described as

306   "sewn closed" and Type IV was described as "nicked" or "cut". Amongst women, the type "flesh

307   removed" was the most common type in 19 countries, "nicked" was the least common type in 13

13

308   countries and "sewn closed" was most common amongst women in two countries (Sudan

309   (77.0%) and Central African Republic (49.6%)). The pooled proportion of women with FGM/C

310   that were "nicked" was 4.8% (95% CI: 2.9-8.1%) (Figure 4a), had "flesh removed" was 65.7%

311   (95% CI: 56.7-73.8%) (Figure 4b), or had their genital area "sewn closed" was 12.1% (CI: 7.4%

312   -19.4%) (Figure 4c). No pooled proportion of types was conducted amongst girls due to

313   inconsistent reporting of types and because the type of FMG/C was only collected in 14 out of 23

314   countries. Amongst girls with FGM/C, "not sewn closed" and "flesh removed" were the most

315   common type in 6 countries each and "sewn closed" was the least common type in 7 countries

316   although it was the most common type in Sierra Leone (83.3%). Surveys using the terms "not

317   sewn closed" may refer to Types, I, II, and IV (Table 3).

318   In all countries, for the majority of women and girls, FGM/C was performed by traditional

319   circumcisers, whilst a lower proportion was performed by medical professionals. The exception

320   was girls in Egypt, where the proportion of FGM/C performed by medical professionals was

321   81.9% (Table 4) [55]. For women, in all countries where age of FGM/C was reported, FGM/C

322   was most commonly performed at early ages (0-5 years) except for Kenya, Egypt, Sierra Leone,

323   Guinea, and Tanzania where the procedure was most commonly done at 9-14 years, and Somalia

324   where it was most commonly done at 5-9 years. For girls, the highest proportion of FGM/C was

325   performed at the lowest age category: under 1 year of age (seven countries). Exceptions include

326   Burkina Faso, Gambia, and Tanzania where the category 1-4 years had higher proportions, Sierra

327   Leone, Kenya, and Guinea (most commonly done at 5-9 years), Egypt (most commonly done at

328   11-12 years) and Somalia (most commonly done at 10-14 years).

329   Sub-regional studies

330   Thirty-three sub-regional studies were from 13 countries, with ten from EMR and 23 from AFR.

331   Among studies including women, the highest FGM/C prevalence was in Somaliland, Somalia

332   (99.1%) [60] and the lowest was in Axum Town, North Ethiopia (0.7%) [61]. Regarding the 17

333   sub-regional studies including girls, the highest FGM/C prevalence was in Kersa, Ethiopia

334   (88.1%) [62] and the lowest was in Axum Town, Ethiopia (0%) [61] (S5 Results, S6 Table).

335   Eight out of the 33 sub-regional studies reported on FGM/C type. Type IV was most common in

336   one study [63] , Type II was the most common in four studies [64-67] and "sewn closed" was the

14

337   most common in two sub-regional DHS reports on Somaliland [60] and the Northeast Zone of

338   Somalia [68] (S5 Results, S7 Table). In 12 studies, the most common performers of FGM/C were

339   traditional circumcisers [62, 63, 66, 69-77]. In three studies, in Egypt [78, 79] and Saudi Arabia

340   [80] medical professionals were more common (S5 Results, S8 Table).

341   School, Community or Facility based studies excluding studies on migrant populations

342   Within 98 non population-based studies, 54 studies (excluding studies on migrant populations)

343   were from 15 countries, with 30 studies from countries in AFR, three studies from Malaysia in

344   SEAR, and 21 studies from countries in EMR (S6 Results, S9 Table). Thirty-one were

345   hospital/clinic-based, 14 school-based, and nine community-based studies. School and

346   university-based studies reported a prevalence ranging from 9.4% [81] to 83.3% [82]; hospital or

347   clinic-based studies reported a prevalence from 13% [83] to 100% [84], and community-based

348   studies reported a prevalence from 0.4% [85] to 99.3% [86] (S6 Results, S10 Table). Two had

349   prospective designs, two were retrospective, one was a cohort study, and 49 were cross-sectional.

350   Twenty-five studies reported on FGM/C types. In ten studies Type I was most common [83, 87-

351   95], Type II was most common in four studies [96-99], Type III in three studies [100-102], and

352   Type IV in two studies [86, 103] (S6 Results, S11 Table).

353   Studies on migrant populations

354   Within the 98 non population-based studies, 44 studies on migrant populations with FGM/C

355   were identified. The included studies were from the Region of the Americas (AMR) (9 studies),

356   European Region (EUR) (25 studies), Western Pacific Region (WPR) (5 studies), and EMR (5

357   studies) (S7 Results, S13 Table). Most studies had a moderate risk of bias and four had a high

358   risk of bias. Participants in these studies were categorized as migrants, refugees, or asylum

359   seekers. Study designs were case control (n=1), and randomised controlled trial (n=1),

360   population based (n=5), retrospective or database studies (n=5), and cross-sectional studies

361   (n=15), case series (n=17). Prevalence within these migrant populations ranged from 0.32% (of a

362   sample of 145,492) [104] to 99% (of a sample of 191) [105] (S8 Results, S14 Table). Type III

363   [104-113] was the most common type in 10 studies, followed by Type II in 9 studies [114-122],

364   Type I (8 studies) [123-130], and Type IV (three studies) [131-133] (S7 Results, S15 Table).

15

Discussion

365

366 This systematic review and meta-analysis estimated that nearly 100 million girls and women of

367 reproductive age had FGM/C, which was among countries included in the analysis. Results

368 indicated that the practice remains widespread in countries where it is reported. In particular,

369 across 28 countries there was a pooled prevalence of 38% among women aged 15-49 years old,

370 and across 23 countries, there was a pooled prevalence of 7% among girls aged 0-14 years old.

371 Over repeated cross-sectional surveys, the prevalence of FGM/C appears to have decreased in 23

372 countries for women and 25 countries for girls. It appears to have increased in three countries for

373 women (Guinea-Bissau, Burkina Faso, and Somalia) and two countries for girls (Djibouti and

374 Cameroon). For both women and girls who had FGM, most had the type "flesh removed" (Types

375 I and II), and "sewn closed" (Type III), the most severe type of FMG/C, was practised over

376 three-quarters of women and girls in Sudan and Sierra Leone. In most countries, FGM/C

377 commonly occurred in early childhood and was performed by traditional circumcisers. FGM/C

378 appears to continue in those who migrate from countries where FGM/C is prevalent.

379 The total prevalence of FGM/C specified in this study is consistent with previous estimates of

380 FGM/C among girls and women of reproductive age where estimates of FGM/C range from 100-

381 140 million women and girls [2, 3]. Our study findings differ to the most recent UNICEF report,

382 which states the global prevalence of FGM/C to be over 200 million among living women and

383 girls; although the upper end of the combined confidence interval was close to this estimate [1,

384 4]. UNICEF extrapolated their prevalence to women of all ages and this study was unable to

385 locate reports to provide an estimate for women from Djibouti, women and girls from Indonesia

386 and this study excluded estimates from surveys that used a household level prevalence of FGM/C

387 among girls.

388 The decline of FGM/C across repeated cross-sectional studies in many countries is encouraging

389 and corresponds with previous research, which showed an absolute decline in the prevalence of

390 FGM/C amongst girls aged 0-14 years by 51.8%; from 67.6% in 1990-1996 to 15.8% in 2015-

391 2017 [21]. Results were consistent with previous research regarding large variations in

392 prevalence between countries and regions [5, 21, 134].

393 Structural level changes including legislative bans and policy changes are likely to play a role in

394 the possible decline. Globally, there are 84 countries that either have specific legislation that

395   bans FGM/C or other legislation that enables the persecution of FGM/C [135, 136]. In Egypt, the

396   lower prevalence for girls may relate to the legal ban implemented in 2008 [55]. However, the

397   efficacy of laws against FGM/C depend on enforcement and the specificities of the law. For

398   example, in Liberia and Mauritania laws only protect girls below the age of 18 [136, 137] and in

399   Indonesia, FGM/C was legalized in a medical setting in 2010, however, the repeal of that law in

400   2014 left no explicit ban or consequences [136, 138]. In Somalia, there is no national legislation

401   that enforces the Somalia constitution which states that "circumcision is prohibited" [135, 136].

402   Furthermore, there is no legislative ban in Mali and the prevalence remains high at 88.6% of

403   women and 72.7% of girls [46].

404   In addition to legislation and judicial enforcement, other mechanisms may have contributed to a

405   reduction in FGM/C, such as education, literacy and change in social norms [139, 140]. To end

406   the propagation of FGM/C future research should undertake process evaluations of structural,

407   community and family level interventions and policies in countries where FGM/C has declined.

408   Understanding the underlying mechanisms for change in FGM/C, in countries where there has

409   been success, will be instrumental for the adoption of effective policies and interventions to meet

410   the SDG target 5.3.

411   Consistent with other studies, the most common FGM/C type amongst women and girls was 'cut

412   with flesh removed', equivalent to Type I or II [5, 141]. Koski and colleagues reported that there

413   were no significant differences regarding the types and severity of FGM/C across cohorts [5].

414   Similar to other findings, this review found that FGM/C most often occurs in early childhood

415   [141].

416   Similar to the findings of this study, UNICEF reported that traditional circumcisers perform most

417   procedures. Yet, the opposite occurs in Egypt where medicalization of FGM/C was high despite

418   its ban [55]. WHO and UNICEF have called for the end of medicalization of FGM/C [142, 143].

419   Discussions around the medicalisation of FGM/C are beyond the scope of this study but this has

420   been discussed elsewhere [142, 144, 145].

421   Studies of different regions or facilities in the same countries had different prevalence reports, a

422   phenomenon also reported by UNICEF [141], likely owing to regional or community risk

423   factors. For example, the national prevalence in Ethiopian women was 65.2% [39], while in one

17

424 region, the East Gojjam Zone, it was 96% [72]. Studies based on migrant populations have

425 widely varying prevalence estimates. They demonstrate that FGM/C is present in countries

426 where it is not traditionally practiced; however, high quality studies are needed to understand

427 FGM/C in these countries, and to inform policies, interventions, and relevant healthcare services.

428 The strengths of the study ensure a thorough and accurate examination of the research question.

429 The review had broad inclusion criteria to provide a comprehensive review of all FGM/C

430 studies. The study used robust methods to identify studies, extract data, and present findings. The

431 broadest possible scope of research was scanned with no restrictions on language. A hand search

432 of grey literature was conducted to be as comprehensive as possible. Moreover, DHS and MICS

433 data, which are collected via representative sampling methodology with high response rates and

434 a low risk of bias, ensured the quality of the meta-analyses.

435 This study had several limitations. Estimates were based on the available published data, which

436 may not reflect the actual global prevalence of FGM/C. There were two missing country reports

437 unavailable for analysis (S1 Methods and Results, S1 Text). The actual global total number of

438 girls and women with FGM/C will be higher than that reported in this study due to missing data

439 from key countries. For example, Indonesia was not included in the meta-analysis due to lack of

440 a denominator. FGM/C was self-reported, thus the prevalence estimates may be underreported

441 due to legal ramifications or social desirability. Furthermore, the translation of terms within

442 surveys may impact recall and comprehension, which emphasizes the need for survey tools to be

443 validated within each context. In addition, women and girls may not be able to accurately recall

444 the type of procedure performed on them, or there may be confusion due to multiple ways of

445 describing each type [146]. Furthermore, recollection of who performed the procedure may be

446 inaccurate [147].

447 The prevalence in the 0-14 age group may be underreported as these girls are still at risk of

448 FGM/C at the time of survey. Future research should adjust prevalence by age at FGM/C

449 procedure or conduct analyses based on age cohorts to be inclusive of those still at risk of

450 FGM/C. A future study examining FGM/C prevalence among five-year age cohorts will be

451 useful to understand if trends exist across age groups [141]. This study also shows the need for

452 consistency in future research regarding the denominator of FGM/C among girls and

453   terminology used to describe each type of FGM/C.

454   This study highlights the need to expand data collection and surveillance using robust

455   methodologies particularly in high resource countries with migrant populations from countries

456   that practice FGM/C. There are numerous data gaps on the national prevalence of FGM/C in

457   multiple countries, including: Colombia, Georgia, Russia, Iran, Oman, Kuwait, Singapore,

458   Thailand, the Philippines, India, Pakistan, Ecuador, Peru, Saudi Arabia, the State of Palestine, Sri

459   Lanka and United Arab Emirates [148]. In Indonesia approximately 50% of girls aged 0-14 had

460   FGM/C; however, we know relatively little about FGM/C in Indonesia, which warrants further

461   investigation given its large population size.

462   In conclusion, approximately 100 million women and girls have had FGM/C among countries

463   included in the analysis, and there is large variation between countries in progress to ending

464   FGM/C by 2030. Current findings may be used as a baseline in future attempts to track progress

465   to meeting SDG 5.3. A decline to end FGM/C across future generation of girls may be possible

466   in the near future in low-prevalence countries such as Niger, Uganda, and Ghana. However, the

467   decline in FGM/C must be greater in countries where the current prevalence of FGM/C is higher

468   such as Egypt, Sudan, Indonesia, Somalia, Djibouti, Guinea, and Mali, which emphasizes the

469   need for immediate interventions and policies to end this harmful practice.

470

471 **Declaration of interests**

472 We declare no competing interests.

473 **Data sharing statement**

474 All data generated or analysed for this study are included in this article and its supplementary

475 files.

476 **Contributors**

477 SM conceived the study and SA, C Akl, and C Akik contributed to the study design. LF and SM

478 wrote the protocol with contributions from SA, C Akl, C Akik. LF completed the literature

479 search. LF and ZD selected the studies and extracted relevant data. LF analysed the data and

480 wrote the first draft of the paper. SM, C Akl, C Akik, SA, and ZD revised drafts and approved

481 the final manuscript. SM supervised LF, and SM is the guarantor of the study.

482 **Acknowledgements**

483 We thank Dr Marie-Claire Rebeiz, Mrs Tanya Khoury, and Ms Sara Mansour who verified the

484 data in the tables.

485

Supporting information

Captions for Figures:

Figure 2. Footnote: There were 30 studies included in the systematic review as nationally-representative studies, however, The Pew Research Study [31] did not include women and the Indonesia RISKESDAS [30] did not report sample sizes, thus they were not included in this analysis.

Figure 3. Footnote: There were 30 studies included in the systematic review as nationally-representative studies, however, surveys from Liberia [45], Niger [49], and Uganda [54] did not include girls, and The Pew Research Study [31], Yemen [33], and Eritrea [32] only included women who reported on at least one daughter in their household who has had FGM/C, and the Indonesia RISKESDAS [30] did not report sample sizes, thus they were not included in this analysis.

S1 Methods and Results

S1 Table. Search Strategy

S2 Table. Inter-rater reliability rate at different stages of the screening process.

Footnote: A third reviewer confirmed the inclusion of all studies. The Cohen's kappa provided a global score across all three inclusion criteria; after the full text screening it was decided that the risk factors of FGM/C would be presented in separate paper. At stage 1, reviewers had the option to indicate if they were unsure, which may also partially explain the low score before resolution. Agreement was higher on the first two points of the inclusion criteria: (i) prevalence studies and (ii) non population-based studies examining FGM/C.

S1 Text. Inclusion and Exclusion Criteria.

S2 Text. Supplementary results.

S2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Checklist

S3 Study Protocol

512   S1 Fig. Funnel plot of FGM/C prevalence in Women of Reproductive Age (15-49 years old) in

513   Nationally Representative Studies.

514   S2 Fig. Funnel plot of FGM/C prevalence in Girls (0-14 years old) in Nationally Representative

515   Studies.

516   **S4 Results: Nationally representative studies**

517   S4 Table. Characteristics of nationally representative studies.

518   Footnote: Abbreviations: AFR: African Region; DHS: Demographic and Health Survey; EMR:
519   Eastern Mediterranean Region; MICS: Multiple Indicator Cluster Surveys; SEAR: South-East
520   Asia Region; WHO: World Health Organization.
521
522   Legend*Not included in meta-analysis.
523

524   **S5 Results: Sub-Regional Population-Based Studies**

525   S5 Table. Characteristics of Sub-Regional Population-Based Studies.

526   Legend: *Patient report and examination, all others: Patient Report   † women reported that at
527   least 1 daughter had FGM/C in the household.

528   Footnote: All studies used cross-sectional methods.

529   S6 Table. Prevalence of FGM/C in Women and Girls in Sub-Regional Population-Based Studies.

530   Footnote: Abbreviations: AFR: African Region EMR: Eastern Mediterranean Region, FGM/C:

531   Female Genital Mutilation/Cutting.

532   Legend: * Women reported that at least 1 daughter had FGM/C in the household. † Youngest
533   daughter had FGM/C. ‡ Due to inconsistent data reported in the study, this number was
534   calculated by the authors of this review.

535   S7 Table. Types of FGM/C in Sub-Regional Population-Based Studies.

536   Legend * % of Women † % of youngest daughter ‡ % of girls

537   Footnote: Somaliland and Northeast Zone MICS calculate the prevalence of types out of the total
538   number of participants, and report type II as "flesh removed" and type II as "sewn closed".
539   Abberviations FGM/C: Female Genital Mutilation/Cutting

540   S8 Table. Characteristics of FGM/C Procedure in Sub-Regional Population-Based Studies.

541 Footnote Abbreviations: AFR: African Region EMR: Eastern Mediterranean Region Female
542 Genital Mutilation/Cutting

543 **S6 Results: School, Community or Facility based studies excluding studies on migrant**
544 **populations**

545 S9 Table. Characteristics of School, Community or Facility based studies excluding studies on
546 migrant populations.

547 Legend: *****Types of FGM/C mentioned were: Clitoral tip excision, Complete clitoridectomy,
548 Clitoridectomy/labia minora Excision, Clitoridectomy/labia minora/Inner majora excision.
549 Footnote: Abbreviations: AFR: African Region EMR: Eastern Mediterranean Region SEAR:
550 South East Asian Region

551 S10 Table. Proportion of FGM/C in Women and Girls in School, Community or Facility based
552 studies excluding studies on migrant populations.

553 Legend: *Out of the female school teachers **Without excluding those who were unsure if they
554 had been mutilated.*** Prevalence according to clinical examination.

555 Footnote: Abbreviations: AFR: African Region EMR: Eastern Mediterranean Region, SEAR:
556 South East Asian Region, FGM/C: Female Genital Mutilation/Cutting

557 S11 Table. Types of FGM/C in School, Community or Facility based studies excluding studies
558 on migrant populations.

559 Footnote: Abbreviations: AFR: African Region EMR: Eastern Mediterranean Region SEAR:
560 South East Asian Region, FGM/C: Female Genital Mutilation/Cutting

561 S12 Table. Characteristics of FGM/C Procedure in School, Community or Facility based studies
562 excluding studies on migrant populations.

563 Footnote: Abbreviations: AFR: African Region EMR: Eastern Mediterranean Region SEAR:
564 South East Asian Region FGM/C: Female Genital Mutilation/Cutting

565 **S7 Results: Studies on Migrant Populations.**

566 S13 Table. Characteristics of Studies on Migrant Populations.

567 Legend: * Tissue removed and sewn closed, tissue removed and some stitching, some tissue
568 removed, pricking. † Flesh removed, Genital area just nicked, Genital area sewn closed

569 Footnote: Abbreviations: EMR: Eastern Mediterranean Region. SEAR: South East Asian
570 Region. EUR: European Region. WPR: Western Pacific Region AMR: American Region

571 S14 Table. Prevalence of FGM/C in Migrant Populations.

572 Footnote: Abbreviations: EMR: Eastern Mediterranean Region. SEAR: South East Asian
573 Region. EUR: European Region. WPR: Western Pacific Region AMR: American Region
574 FGM/C: Female Genital Mutilation/Cutting

575 S15 Table. Types of FGM/C in Migrant Populations.

576 Legend: *Flesh removed and some stitching † Flesh removed and sown closed.
577 Footnote: Abbreviations: EMR: Eastern Mediterranean Region. SEAR: South East Asian
578 Region. EUR: European Region. WPR: Western Pacific Region AMR: American Region
579 FGM/C: Female Genital Mutilation/Cutting

580 S16 Table. Characteristics of FGM/C Procedure for Migrant Populations.

581 Footnote: Abbreviations: EMR: Eastern Mediterranean Region. SEAR: South East Asian
582 Region. EUR: European Region. WPR: Western Pacific Region AMR: American Region
583 FGM/C: Female Genital Mutilation/Cutting

584

References

1.   UNICEF. Female Genital Mutilation: UNICEF; 2022. Available from: https://data.unicef.org/topic/child-protection/female-genital-mutilation/ Date Accessed: 22-04-2022.

2.   UNFPA. Demographic Perspectives on Female Genital Mutilation New York: UNFPA; 2015. Available from: https://sustainabledevelopment.un.org/content/documents/19961027123_UN_Demograhics_v3%20(1).pdf Date Accessed: 22-04-2022.

3.   Population Reference Bureau. Female Genital Mutilation/Cutting: Data and Trends Update 2014 – Infographic 2014. Available from: https://www.prb.org/resources/female-genital-mutilation-cutting-data-and-trends-update-2014/ Date Accessed: 22-04-2022.

4.   UNICEF. Female Genital Mutilation/Cutting: A global concern New York: UNICEF; 2016. Available from: https://www.unicef.org/media/files/FGMC_2016_brochure_final_UNICEF_SPREAD.pdf Date Accessed: 22-04-2022.

5.   Koski A, Heymann J. Thirty-year trends in the prevalence and severity of female genital mutilation: a comparison of 22 countries. BMJ Global Health. 2017;2(4):e000467. PubMed PMID: 29225952.

6.   Kandala NB, Ezejimofor MC, Uthman OA, Komba P. Secular trends in the prevalence of female genital mutilation/cutting among girls: a systematic analysis. Bmj Global Health. 2018;3(5). doi: 10.1136/bmjgh-2017-000549. PubMed PMID: WOS:000457716300001.

7.   El-Dirani Z, Farouki L, Akl C, Ali U, Akik C, McCall SJ. Factors associated with female genital mutilation: a systematic review and synthesis of national, regional and community-based studies. BMJ Sexual & Reproductive Health. 2022:bmjsrh-2021-201399. doi: 10.1136/bmjsrh-2021-201399.

8.   Kobach A, Ruf-Leuschner M, Elbert T. Psychopathological sequelae of female genital mutilation and their neuroendocrinological associations. BMC Psychiatry. 2018;18(1):187. PubMed PMID: 29895282.

9.   Reisel D, Creighton SM. Long term health consequences of Female Genital Mutilation (FGM). Maturitas. 2015;80(1):48-51. PubMed PMID: 25466303.

10.   Sarayloo K. RR, Elhadi A. Health consequences of the female genital mutilation: a systematic review. Galen Medical Journal 2018;8:1336. 2019.

11.   Lurie JM, Weidman A, Huynh S, Delgado D, Easthausen I, Kaur G. Painful gynecologic and obstetric complications of female genital mutilation/cutting: A systematic review and meta-analysis. PLoS medicine. 2020;17(3):e1003088-e. doi: 10.1371/journal.pmed.1003088.

12.   Tordrup D, Bishop C, Green N, Petzold M, Vallejo FR, Vogel JP, et al. Economic burden of female genital mutilation in 27 high-prevalence countries. BMJ global health. 2022;7(2). doi: 10.1136/bmjgh-2020-004512.

13.   Odukogbe ATA, Afolabi BB, Bello OO, Adeyanju AS. Female genital mutilation/cutting in Africa. Translational Andrology and Urology. 2017;6(2):138-48. doi: 10.21037/tau.2016.12.01.

14.   World Health Organisation. Female genital mutilation 2022. Available from: https://www.who.int/news-room/fact-sheets/detail/female-genital-mutilation Date Accessed: 02-05-2022.

15.   Banks E, Meirik O, Farley T, Akande O, Bathija H, Ali M. Female genital mutilation and obstetric outcome: WHO collaborative prospective study in six African countries. Lancet. 2006;367(9525):1835-41. doi: 10.1016/s0140-6736(06)68805-3. PubMed PMID: 16753486.

16.   Evidence Partners. DistillerSR. Version 2.35. Available from: https://www.evidencepartners.com. Accessed: March 2020-April 2022.

17.   Moher D, Liberati A, Tetzlaff J, Altman DG. Reprint—Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. Physical therapy. 2009;89(9):873-80. doi: 10.1093/ptj/89.9.873.

18. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ (Online). 2021;372. doi: 10.1136/bmj.n71.

19. Farouki L, Abdulrahim, S., Akl, C., Akik, C., McCall, S. The global prevalence, distribution and determinants of female genital mutilation: a protocol for a systematic review and meta-analysis. Open Science Framework. 2020.

20. Hoy D, Brooks P, Woolf A, Blyth F, March L, Bain C, et al. Assessing risk of bias in prevalence studies: modification of an existing tool and evidence of interrater agreement. Journal of clinical epidemiology. 2012;65(9):934-9. doi: 10.1016/j.jclinepi.2011.11.014.

21. Kandala NB, Ezejimofor MC, Uthman OA, Komba P. Secular trends in the prevalence of female genital mutilation/cutting among girls: a systematic analysis. BMJ Global Health. 2018;3(5):e000549. PubMed PMID: 30483404.

22. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. BMJ. 2003;327(7414):557. doi: 10.1136/bmj.327.7414.557.

23. Migliavaca CB, Stein C, Colpani V, Barker TH, Ziegelmann PK, Munn Z, et al. Meta-analysis of prevalence: I 2 statistic and how to deal with heterogeneity. Research synthesis methods. 2022.

24. Spineli LM, Pandis N. Prediction interval in random-effects meta-analysis. American journal of orthodontics and dentofacial orthopedics. 2020;157(4):586-8. doi: 10.1016/j.ajodo.2019.12.011.

25. Higgins JPT. Commentary: Heterogeneity in meta-analysis should be expected and appropriately quantified. International Journal of Epidemiology. 2008;37(5):1158-60. doi: 10.1093/ije/dyn204.

26. Lin L, Chu H. Meta-analysis of Proportions Using Generalized Linear Mixed Models. Epidemiology (Cambridge, Mass). 2020;31(5):713-7. doi: 10.1097/EDE.0000000000001232.

27. Nyaga VN, Arbyn M, Aerts M. Metaprop: a Stata command to perform meta-analysis of binomial data. Archives of Public Health. 2014;72(1):39. doi: 10.1186/2049-3258-72-39.

28. Kumar M. Funnel Plots for Proportion Data 2018. Available from: https://cran.r-project.org/web/packages/funnelR/index.html Date Accessed: 23-04-22.

29. UN Department of Economic and Social Affairs Population Dynamics. Quinquennial Population by Five-Year Age Groups - Female. 2019.

30. Health Research and Development Agency. Riset Kesehatan Dasar (RISKESDAS) 2013. Indonesia: Government of Indonesia, 2013.

31. Pew Research Center. Tolerance and Tension: Islam and Christianity in Sub-Saharan Africa. Pew Research Center, 2010.

32. National Statistics Office Fafo Institute For Applied International Studies. Eritrea Population and Health Survey 2010. Asmara, Eritrea: World Health Organisation, 2013.

33. Ministry of Public Health and Population. Yemen National Health and Demographic Survey 2013. Rockville, Maryland, USA: MOPHP, CSO, PAPFAM, and ICF International, 2015.

34. Institut national de la statistique et de l'analyse économique (INSAE). Enquête par grappes à indicateurs multiples 2014, Rapport final. Cotonou, Bénin: UNICEF, 2015.

35. Institut National de la Statistique et de la DÈmographie IBF, International ICF. Burkina Faso EnquÍte DÈmographique et de SantÈ et ‡ Indicateurs Multiples (EDSBF-MICS IV) 2010. Calverton, Maryland, USA: Institut National de la Statistique et de la DÈmographie - INSD/Burkina Faso and ICF International, 2012.

36. Institut Centrafricain des Statistiques et des Etudes Economiques et Sociales. Central African Republic Multiple Indicator Cluster Survey 2018-2019 Bangui, République Centrafricaine: UNICEF, 2021.

37. INSEED and UNICEF. Enquête par grappes à indicateurs multiples Tchad 2019. N'Djamena, Tchad: UNICEF, 2021.

38. Institute National de la Statistique. Enquête par grappes à indicateurs multiples - Côte d'Ivoire 2016. Cote D'Ivoire: UNICEF, 2017.

39. Central Statistical Agency & ICF. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia: CSA and ICF, 2017.

26

40.   Gambia Bureau of Statistics. The Gambia Demographic and Health Survey 2019-20. Banjul, The Gambia: The DHS Program ICF Rockville, Maryland, USA, 2021.

41.   Ghana Statistical Service. Multiple Indicator Cluster Survey (MICS2017/18), Survey Findings Report. Accra, Ghana: UNICEF, 2018.

42.   Institut National de la Statistique Ministère du Plan et du Développement Economique & ICF. République de Guinée Enquête Démographique et de Santé 2018. Conakry, Guinée: The DHS Program, ICF Rockville, Maryland, USA, 2019.

43.   Ministério da Economia e Finanças D-GdP, Instituto Nacional de Estatistica,. Inquérito aos Indicadores Múltiplos (MICS6) 2018-2019, Relatório Final. Bissau, Guiné-Bissau: UNICEF, 2020.

44.   Kenya National Bureau of Statistics & ICF. Kenya Demographic and Health Survey 2014. Rockville, MD, USA: Kenya National Bureau of Statistics and ICF International, 2015.

45.   Liberia Institute of Statistics and Geo-Information Services. Liberia Demographic and Health Survey 2019-20 - Key Indicators Report. Monrovia, Liberia: LSGIS ICF International, 2020.

46.   Institut National de la Statistique (INSTAT) Cellule de Planification et de Statistique Secteur Santé-Développement Social et Promotion de la Famille (CPS/SS-DS-PF) & ICF. Mali Demographic and Health Survey 2018. Bamako, Mali: INSTAT/CPS/SS-DS-PF and ICF, 2019.

47.   Mauritania National Statistics Office. Enquête par Grappes à Indicateurs Multiples, 2015, Résultats clés. Nouakchott, Mauritanie: UNICEF, 2016.

48.   National Population Commission (NPC) [Nigeria] & ICF. Nigeria Demographic and Health Survey 2018 - Final Report. Abuja, Nigeria: NPC and ICF, 2019.

49.   Institut National de la Statistique INSN, International ICF. Niger Enquéte Demographique et de Santè et ‡ Indicateurs Multiples (EDSN-MICS IV) 2012. Calverton, Maryland, USA: INS/Niger and ICF International, 2013.

50.   Agence Nationale de la Statistique et de la Démographie (ANSD). Enquête Démographique et de Santé Continue - EDS-Continue 2019. Dakar, Sénégal: The DHS Program ICF Rockville, Maryland, USA 2020.

51.   Statistics Sierra Leone & ICF. Sierra Leone Demographic and Health Survey 2019. Freetown, Sierra Leone: Ministry of Health and Sanitation and ICF International, 2020.

52.   Ministry of Health Tanzania and Zanzibar National Bureau of Statistics Office of Chief Government Statistician Zanzibar ICF. Tanzania Demographic and Health Survey and Malaria Indicator Survey 2015-2016. Dar es Salaam, Tanzania: MoHCDGEC, MoH, NBS, OCGS, and ICF, 2016.

53.   Institut National de la Statistique et des Etudes Economiques et Démographiques. Togo - Enquête à Indicateurs Multiples 2017, Rapport final. Lomé, Togo: UNICEF, 2018.

54.   Uganda Bureau of Statistics and ICF. Uganda Demographic and Health Survey 2016. Kampala, Uganda: UBOS and ICF, 2018.

55.   Ministry of Health Population El Zanaty and associates and ICF International. Egypt Demographic and Health Survey 2014. Cairo, Egypt: Ministry of Health and Population and ICF International, 2015.

56.   Central Statistical Organization. Iraq Multiple Indicator Cluster Survey 2018 Survey Findings Report. Iraq: UNICEF, 2019.

57.   Central Bureau of Statistics & UNICEF Sudan. Multiple Indicator Cluster Survey 2014 of Sudan, Final Report. Khartoum, Sudan: UNICEF, 2016.

58.   Directorate of National Statistics. Somalia Health and Demographic Survey 2020. Federal Government of Somalia, United Nations Population Fund, 2020.

59.   Ministry of Health and ICF. Maldives Demographic and Health Survey 2016-17. Malé, Maldives: MOH and ICF, 2018.

60.   Phadungkiatwattana P, Rujivejpongsathron J, Tunsatit T, Yanase Y. Analyzing pregnancy outcomes in women of extremely advanced maternal age (> or = 45 years). J Med Assoc Thai. 2014;97(1):1-6. PubMed PMID: 24701722.

61.   Gebrekirstos K, Abebe M, Fantahun A. A cross sectional study on factors associated with harmful traditional practices among children less than 5 years in Axum town, north Ethiopia, 2013. Reproductive Health. 2014;11:46. PubMed PMID: 24952584.

62.   Yirga WS, Kassa NA, Gebremichael MW, Aro AR. Female genital mutilation: prevalence, perceptions and effect on women's health in Kersa district of Ethiopia. International Journal of Women's Health. 2012;4:45-54. PubMed PMID: 22371659.

63.   Gudeta TA, Regassa TM, Gamtessa LC. Female genital mutilation: prevalence, associated factors and health consequences among reproductive age group women in Keffa Zone, Southwest, Ethiopia. Reproductive Health. 2022;19(1):9. doi: 10.1186/s12978-022-01364-3. PubMed PMID: WOS:000764993700001.

64.   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. doi: 10.1186/1471-2458-14-1076.

65.   Johnson OE, Okon RD. Perception and practice of female genital cutting in a rural community in southern Nigeria. African journal of reproductive health. 2012;16(4):132-9.

66.   Greis A, Barnighausen T, Bountogo M, Ouermi L, Sie A, Harling G. Attitudes towards female genital cutting among adolescents in rural Burkina Faso: a multilevel analysis. Tropical Medicine & International Health. 2020;25(1):119-31. PubMed PMID: 31698528.

67.   Greis A, Barnighausen T, Bountogo M, Ouermi L, Si A, Harling G. Attitudes towards female genital cutting among adolescents in rural Burkina Faso: a multilevel analysis. Tropical Medicine & International Health. 2020;25(1):119-31. doi: 10.1111/tmi.13338. PubMed PMID: WOS:000509501600013.

68.   Northeast Somalia Ministry of Planning and International Cooperation. Northeast Zone, Somalia Monitoring the situation of children and women Multiple Indicator Cluster Survey 2011 Nairobi, Kenya: UNICEF, 2014.

69.   Oljira T, Assefa N, Dessie Y. Female genital mutilation among mothers and daughters in Harar, eastern Ethiopia. International Journal of Gynaecology & Obstetrics. 2016;135(3):304-9. PubMed PMID: 27609740.

70.   Gajaa M, Wakgari N, Kebede Y, Derseh L. Prevalence and associated factors of circumcision among daughters of reproductive aged women in the Hababo Guduru District, Western Ethiopia: a cross-sectional study. BMC Women's Health. 2016;16:42. PubMed PMID: 27449648.

71.   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. PubMed PMID: 19635149.

72.   Andualem M. Determinants of Female Genital Mutilation Practices in East Gojjam Zone, Western Amhara, Ethiopia. Ethiopian Medical Journal. 2016;54(3):109-16. PubMed PMID: 29115777.

73.   Abebe S, Dessalegn M, Hailu Y, Makonnen M. Prevalence and Barriers to Ending Female Genital Cutting: The Case of Afar and Amhara Regions of Ethiopia. International Journal of Environmental Research and Public Health. 2020;17(21):16. doi: 10.3390/ijerph17217960. PubMed PMID: WOS:000588904300001.

74.   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(2):138-50.

75.   Johnson OE, Okon RD. Perception and practice of female genital cutting in a rural community in southern Nigeria. African Journal of Reproductive Health. 2012;16(4):132-9. PubMed PMID: 23444550.

76.   Bjalkander O, Leigh B, Harman G, Bergstrom S, Almroth L. Female genital mutilation in Sierra Leone: who are the decision makers? African Journal of Reproductive Health. 2012;16(4):119-31. PubMed PMID: 23444549.

77.   Mohammed ES, Seedhom AE, Mahfouz EM. Female genital mutilation: current awareness, believes and future intention in rural Egypt. Reproductive Health. 2018;15(1):175. PubMed PMID: 30333019.

78.   Salama I, Sami S, Rabah T, Salama S, Mohsin AA. Female genital mutilation among egyptian school children. European Journal of Pediatrics. 2017;176(11):1463-4. doi: 10.1007/s00431-017-2979-8.
79.   Zayed AA, Ali AA. Abusing female children by circumcision is continued in Egypt. Journal of Forensic & Legal Medicine. 2012;19(4):196-200. PubMed PMID: 22520370.
80.   Milaat WA, Ibrahim NK, Albar HM. Reproductive health profile and circumcision of females in the Hali semi-urban region, Saudi Arabia: A community-based crosssectional survey. Annals of Saudi Medicine. 2018;38(2):81-9. doi: 10.5144/0256-4947.2018.81.
81.   Chinawa AT, Chinawa JM, Ossai EN, Aronu AE, Ozokoli GE, Enebe J. Pattern of Female Genital Mutilation among Adolescents Attending Secondary Schools' in Enugu Metropolis. Journal of Tropical Pediatrics. 2021;67(1):10. doi: 10.1093/tropej/fmaa103. PubMed PMID: WOS:000637542600031.
82.   Ali AA, Okud A, Mohammed AA, Abdelhadi MA. Prevalence of and factors affecting female genital mutilation among schoolgirls in Eastern Sudan. International Journal of Gynaecology & Obstetrics. 2013;120(3):288-9. PubMed PMID: 23219094.
83.   Garba ID, Muhammed Z, Abubakar IS, Yakasai IA. Prevalence of female genital mutilation among female infants in Kano, Northern Nigeria. Archives of Gynecology & Obstetrics. 2012;286(2):423-8. PubMed PMID: 22491808.
84.   Bjälkander O, Bangura L, Leigh B, Berggren V, Bergström S, Almroth L. Health complications of female genital mutilation in Sierra Leone. International Journal of Women's Health. 2012;4(1):321-31. doi: 10.2147/ijwh.s32670.
85.   Jimoh AO, Adaji SE, Adelaiye H, Olorukooba AA, Bawa U, Ibrahim HI, et al. A cross-sectional study of traditional practices affecting maternal and newborn health in rural Nigeria. The Pan African medical journal. 2018;31:64. PubMed PMID: 31007811.
86.   Rashid A, Iguchi Y. Female genital cutting in Malaysia: a mixed-methods study. BMJ Open. 2019;9(4):e025078. PubMed PMID: 30940756.
87.   Suleiman IR, Maro E, Shayo BC, Alloyce JP, Masenga G, Mahande MJ, et al. Trend in female genital mutilation and its associated adverse birth outcomes: A 10-year retrospective birth registry study in Northern Tanzania. Plos One. 2021;16(1):13. doi: 10.1371/journal.pone.0244888. PubMed PMID: WOS:000607915500017.
88.   Kaplan A, Forbes M, Bonhoure I, Utzet M, Martin M, Manneh M, et al. Female genital mutilation/cutting in The Gambia: long-term health consequences and complications during delivery and for the newborn. International Journal of Women's Health. 2013;5:323-31. PubMed PMID: 23843705.
89.   Gebremariam K, Assefa D, Weldegebreal F. Prevalence and associated factors of female genital cutting among young adult females in Jigjiga district, eastern Ethiopia: a cross-sectional mixed study. International Journal of Women's Health. 2016;8:357-65. PubMed PMID: 27563257.
90.   Mitwaly A AB, Abd El Aal DEM, Aziz PA, Hassanin AI, Abbas AM. A recent look for the implication and attitude of practicing female genital mutilation in upper Egypt: a cross sectional study. International Journal of Reproduction, Contraception, Obstetrics and Gynecology; Vol 6, No 10 (2017): October 2017DO - 1018203/2320-1770ijrcog20174398. 2017.
91.   Abdel-Aleem MA, Elkady MM, Hilmy YA. The relationship between female genital cutting and sexual problems experienced in the first two months of marriage. International Journal of Gynaecology & Obstetrics. 2016;132(3):305-8. PubMed PMID: 26686766.
92.   Yasin BA, Al-Tawil NG, Shabila NP, Al-Hadithi TS. Female genital mutilation among Iraqi Kurdish women: a cross-sectional study from Erbil city. BMC Public Health. 2013;13:809. PubMed PMID: 24010850.
93.   Saleem RA, Othman N, Fattah FH, Hazim L, Adnan B. Female genital mutilation in Iraqi Kurdistan: description and associated factors. Women & Health. 2013;53(6):537-51. PubMed PMID: 23937728.
94.   Adiguzel C, Bas Y, Erhan MD, Gelle MA. The Female Genital Mutilation/Cutting Experience in Somali Women: Their Wishes, Knowledge and Attitude. Gynecologic & Obstetric Investigation. 2019;84(2):118-27. PubMed PMID: 30227436.

95.   Dehghankhalili M, Fallahi S, Mahmudi F, Ghaffarpasand F, Shahrzad ME, Taghavi M, et al. Epidemiology, regional characteristics, knowledge, and attitude toward female genital mutilation/cutting in Southern Iran. Journal of Sexual Medicine. 2015;12(7):1577-83. doi: 10.1111/jsm.12938. PubMed PMID: 2015-33398-004.

96.   Makinde ON, Elusiyan JB, Adeyemi AB, Taiwo OT. FEMALE GENITAL MUTILATION: ARE WE WINNING? East African medical journal. 2012;89(6):193-8.

97.   Lawani LO, Onyebuchi AK, Iyoke CA, Okeke NE. Female genital mutilation and efforts to achieve Millennium Development Goals 3, 4, and 5 in southeast Nigeria. International Journal of Gynaecology & Obstetrics. 2014;125(2):125-8. PubMed PMID: 24602774.

98.   Minsart AF, N'Guyen T S, Ali Hadji R, Caillet M. Maternal infibulation and obstetrical outcome in Djibouti. Journal of Maternal-Fetal & Neonatal Medicine. 2015;28(14):1741-6. PubMed PMID: 25234101.

99.   Birge O, Arslan D, Ozbey EG, Adiyeke M, Kayar I, Erkan MM, et al. Which type of circumcision is more harmful to female sexual functions? Clinical and Experimental Obstetrics and Gynecology. 2017;44(5):691-4. doi: 10.12891/ceog3464.2017.

100.   Gudu W, Abdulahi M. Labor, Delivery and Postpartum Complications in Nulliparous Women with Female Genital Mutilation Admitted to Karamara Hospital. Ethiopian Medical Journal. 2017;55(1):11-7. PubMed PMID: 29148634.

101.   Sharfi AR, Elmegboul MA, Abdella AA. The continuing challenge of female genital mutilation in Sudan. African Journal of Urology. 2013;19(3):136-40. doi: 10.1016/j.afju.2013.06.002.

102.   Birge O, Serin AN, Bakir MS. Female genital mutilation/cutting in sudan and subsequent pelvic floor dysfunction. BMC Womens Health. 2021;21(1):8. doi: 10.1186/s12905-021-01576-y. PubMed PMID: WOS:000734775000006.

103.   Ashimi AO, Amole TG, Iliyasu Z. Prevalence and predictors of female genital mutilation among infants in a semi urban community in northern Nigeria. Sexual and Reproductive Healthcare. 2015;6(4):243-8. doi: 10.1016/j.srhc.2015.05.005.

104.   Korfker DG, Reis R, Rijnders ME, Meijer-van Asperen S, Read L, Sanjuan M, et al. The lower prevalence of female genital mutilation in the Netherlands: a nationwide study in Dutch midwifery practices. International Journal of Public Health. 2012;57(2):413-20. PubMed PMID: 22314540.

105.   Wahlberg A, Johnsdotter S, Selling KE, Kallestal C, Essen B. Baseline data from a planned RCT on attitudes to female genital cutting after migration: when are interventions justified? BMJ Open. 2017;7(8):e017506. PubMed PMID: 28801440.

106.   Davis G, Jellins J. Female genital mutilation: Obstetric outcomes in metropolitan Sydney. Australian & New Zealand Journal of Obstetrics & Gynaecology. 2019;59(2):312-6. PubMed PMID: 30734267.

107.   Johnson-Agbakwu CE, Fox KA, Banke-Thomas A, Michlig GJ. Influence of Female Genital Mutilation/Cutting on Health Morbidity, Health Service Utilization and Satisfaction with Care among Somali Women and Teenage Girls in the United States. J Racial Ethn Health Disparities. 2022:9. doi: 10.1007/s40615-022-01266-x. PubMed PMID: WOS:000766061800001.

108.   Michlig G, Warren N, Berhe M, Johnson-Agbakwu C. Female Genital Mutilation/Cutting among Somali Women in the US State of Arizona: Evidence of Treatment Access, Health Service Use and Care Experiences. International Journal of Environmental Research and Public Health. 2021;18(7):15. doi: 10.3390/ijerph18073733. PubMed PMID: WOS:000638497400001.

109.   Padovese V, Egidi AM, Melillo Fenech T, Podda Connor M, Didero D, Costanzo G, et al. Migration and determinants of health: clinical epidemiological characteristics of migrants in Malta (2010-11). Journal of Public Health. 2014;36(3):368-74. PubMed PMID: 24277779.

110.   Wahlberg A, Johnsdotter S, Ekholm Selling K, Essen B. Shifting perceptions of female genital cutting in a Swedish migration context. PLoS ONE [Electronic Resource]. 2019;14(12):e0225629. PubMed PMID: 31800614.

111.   Cottler-Casanova S, Horowicz M, Gayet-Ageron A, Abdulcadir J. Female genital mutilation/cutting (FGM/C) coding capacities in Swiss university hospitals using the International

Classification of Diseases (ICD). Bmc Public Health. 2021;21(1):11. doi: 10.1186/s12889-021-11160-6. PubMed PMID: WOS:000664845500001.

112. Taraldsen S, Owe KM, Bodtker AS, Bjorntvedt IW, Midhaugeide B, Sandberg M, et al. Female genital cutting in women living in Norway - consequences and treatment. Tidsskrift for Den Norske Laegeforening. 2021;141(15):1438-44. PubMed PMID: WOS:000714665500010.

113. Kawous R, van den Muijsenbergh M, Geraci D, Hendriks KRM, Ortensi LE, Hilverda F, et al. Estimates of female genital mutilation/cutting in the Netherlands: a comparison between a nationwide survey in midwifery practices and extrapolation-model. Bmc Public Health. 2020;20(1):6. doi: 10.1186/s12889-020-09151-0. PubMed PMID: WOS:000548954800016.

114. Shukralla HK, McGurgan P. Maternity care of women affected by female genital mutilation/cutting: An audit of two Australian hospitals. Women and Birth. 2020;33(4):E326-E31. doi: 10.1016/j.wombi.2019.07.008. PubMed PMID: WOS:000541401900003.

115. Ukoha DE. Female genital mutilation/circumcision: Culture and women sexual health in lgbo women residing in Dallas-Fort Worth, Texas: ProQuest Information & Learning; 2016.

116. Wikholm K, Mishori R, Ottenheimer D, Korostyshevskiy V, Reingold R, Wikholm C, et al. Female Genital Mutilation/Cutting as Grounds for Asylum Requests in the US: An Analysis of More than 100 Cases. Journal of Immigrant and Minority Health. 2020;22(4):675-81. doi: 10.1007/s10903-020-00994-8. PubMed PMID: WOS:000520809300001.

117. Vrachnis N, Salakos N, Iavazzo C, Bakalianou K, Kouiroukidou P, Iliodromiti Z, et al. Female genital mutilation: A new reality for Greek healthcare providers. European Journal of Contraception and Reproductive Health Care. 2012;17:S129. doi: 10.3109/13625187.2012.673963.

118. Zinka B, Ackermann I, Bormann C, Graw M. [Female genital mutilation in refugees]. MMW Fortschritte der Medizin. 2018;160(3):56-9. PubMed PMID: 29464617.

119. Hänselmann K, Börsch C, Ikenberg H, Strehlau J, Klug SJ. Female genital mutilation in Germany. Geburtshilfe und Frauenheilkunde. 2011;71(3):205-8. doi: 10.1055/s-0030-1270887.

120. Kartal YA, Yazici S. Female genital mutilation: Experiences, attitudes and perceptions of Somali female students living in Turkey. Perspect Psychiatr Care. 2021;57(4):1937-43. doi: 10.1111/ppc.12769. PubMed PMID: WOS:000631095500001.

121. Frick A, Azuaga A, Abdulcadir J. Cervical dysplasia among migrant women with female genital mutilation/cutting type III: A cross-sectional study. Int J Gynecol Obstet. 2021:7. doi: 10.1002/ijgo.13921. PubMed PMID: WOS:000705333500001.

122. Division of Sexual R, Child and Youth Health; Division of Health Statistics and Monitoring; Shared Services Ministry of Health (SPMS). Mutilação Genital Feminina Análise dos casos registados na PDS/RSE- PP 2014 - 2017. Government of Portugal, 2018.

123. Rouzi AA, Berg RC, Sahly N, Alkafy S, Alzaban F, Abduljabbar H. Effects of female genital mutilation/cutting on the sexual function of Sudanese women: a cross-sectional study. American Journal of Obstetrics and Gynecology. 2017;217(1). doi: 10.1016/j.ajog.2017.02.044. PubMed PMID: WOS:000405276800015.

124. Al Awar S, Al-Jefout M, Osman N, Balayah Z, Al Kindi N, Ucenic T. Prevalence, knowledge, attitude and practices of female genital mutilation and cutting (FGM/C) among United Arab Emirates population. BMC Womens Health. 2020;20(1):12. doi: 10.1186/s12905-020-00949-z. PubMed PMID: WOS:000529898100003.

125. Zurynski Y, Phu A, Sureshkumar P, Cherian S, Deverell M, Elliott EJ, et al. Female genital mutilation in children presenting to Australian paediatricians. Archives of Disease in Childhood. 2017;102(6):509-15. PubMed PMID: 28082321.

126. Varol N, Dawson A, Turkmani S, Hall JJ, Nanayakkara S, Jenkins G, et al. Obstetric outcomes for women with female genital mutilation at an Australian hospital, 2006-2012: a descriptive study. BMC Pregnancy & Childbirth. 2016;16(1):328. PubMed PMID: 27793119.

127. Geynisman-Tan J, Milewski A, Dahl C, Collins S, Mueller M, Kenton K, et al. Lower Urinary Tract Symptoms in Women With Female Genital Mutilation. Female Pelvic Medicine & Reconstructive Surgery. 2019;25(2):157-60. PubMed PMID: 30807420.

128.   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. Journal of Aggression, Maltreatment & Trauma. 2016;25(1):63-83. doi: 10.1080/10926771.2015.1081663. PubMed PMID: 2016-08151-006.

129.   Castagna P, Ricciardelli R, Piazza F, Mattutino G, Pattarino B, Canavese A, et al. Violence against African migrant women living in Turin: clinical and forensic evaluation. International Journal of Legal Medicine. 2018;132(4):1197-204. PubMed PMID: 29308532.

130.   Ali S, Patel R, Armitage AJ, Learner HI, Creighton SM, Hodes D. Female genital mutilation (FGM) in UK children: a review of a dedicated paediatric service for FGM. Archives of Disease in Childhood. 2020;105(11):1075-8. doi: 10.1136/archdischild-2019-318336. PubMed PMID: WOS:000585987800012.

131.   Rouzi AA, Berg RC, Alamoudi R, Alzaban F, Sehlo M. Survey on female genital mutilation/cutting in Jeddah, Saudi Arabia. BMJ Open. 2019;9(5):e024684. PubMed PMID: 31154295.

132.   Creighton SM, Dear J, de Campos C, Williams L, Hodes D. Multidisciplinary approach to the management of children with female genital mutilation (FGM) or suspected FGM: service description and case series. BMJ Open. 2016;6(2):e010311. PubMed PMID: 26928027.

133.   Hodes D, Armitage A, Robinson K, Creighton SM. Female genital mutilation in children presenting to a London safeguarding clinic: a case series. Archives of Disease in Childhood. 2016;101(3):212-6. PubMed PMID: 26216833.

134.   Yoder PS, Wang S. Female genital cutting: the interpretation of recent DHS data Calverton, Maryland, USA: ICF International; 2013. Available from: http://dhsprogram.com/pubs/pdf/CR33/CR33.pdf.

135.   UNFPA. Female genital mutilation (FGM) frequently asked questions 2019. Available from: https://www.unfpa.org/resources/female-genital-mutilation-fgm-frequently-asked-questions Date Accessed: 22-04-2022.

136.   World Bank. Compendium of international and national legal frameworks on female genital mutilation 2021. Available from: https://openknowledge.worldbank.org/bitstream/handle/10986/35112/Compendium-of-International-and-National-Legal-Frameworks-on-Female-Genital-Mutilation-Fifth-Edition.pdf?sequence=1&isAllowed=y Date Accessed: 22-04-2022.

137.   FGM And The Law Around The World: Equality Now; 2019. Available from: https://www.equalitynow.org/the_law_and_fgm Date Accessed: 22-04-2022.

138.   Akinsulure-Smith AM, Sicalides EI. Female genital cutting in the United States: Implications for mental health professionals. Professional Psychology: Research and Practice. 2016;47(5):356-62. doi: 10.1037/pro0000079. PubMed PMID: 2016-39047-001.

139.   Ameyaw EK, Tetteh JK, Armah-Ansah EK, Aduo-Adjei K, Sena-Iddrisu A. Female genital mutilation/cutting in Sierra Leone: are educated women intending to circumcise their daughters? BMC international health and human rights. 2020;20(1):1-19. doi: 10.1186/s12914-020-00240-0.

140.   Ahinkorah BO. Factors associated with female genital mutilation among women of reproductive age and girls aged 0-14 in Chad: a mixed-effects multilevel analysis of the 2014-2015 Chad demographic and health survey data. BMC public health. 2021;21(1):286-. doi: 10.1186/s12889-021-10293-y.

141.   Female Genital Mutilation/Cutting: A statistical overview and exploration of the dynamics of change 2013 [updated 23/12/2020]. Available from: https://data.unicef.org/resources/fgm-statistical-overview-and-dynamics-of-change/ Date Accessed: 02-05-2022.

142.   WHO. Female Genital Mutilation 2021. Available from: https://www.who.int/en/news-room/fact-sheets/detail/female-genital-mutilation Date Accessed 27-04-22.

143.   UNICEF. Calling for the end of the medicalization of female genital mutilation. 2018. Available from: https://www.unicef.org/sites/default/files/2019-02/Factsheet%20FGM-Medicalization-2018-06-15.pdf Date Accessed 27-04-22.

144.   Leye E, Van Eekert N, Shamu S, Esho T, Barrett H, Anser. Debating medicalization of Female Genital Mutilation/Cutting (FGM/C): learning from (policy) experiences across countries. Reproductive Health. 2019;16(1). doi: 10.1186/s12978-019-0817-3. PubMed PMID: WOS:000494464200002.

145.   Van Eekert N, Buffel V, De Bruyn S, Van de Velde S. The medicalisation of female genital cutting: Harm reduction or social norm? Sociology of health & illness. 2021;43(2):263-80. doi: 10.1111/1467-9566.13153.

146.   Elmusharaf S, Elhadi N, Almroth L. Reliability of self reported form of female genital mutilation and WHO classification: cross sectional study. BMJ. 2006;333(7559):124-7. Epub International edition. doi: 10.1136/bmj.38873.649074.55.

147.   Egger M, Smith GD, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. BMJ. 1997;315(7109):629-34. doi: 10.1136/bmj.315.7109.629.

148.   Cappa C, Van Baelen L, Leye E. The practice of female genital mutilation across the world: Data availability and approaches to measurement. Global Public Health. 2019;14(8):1139-52. doi: 10.1080/17441692.2019.1571091.

149.   Tantet C, Aupiais C, Bourdon M, Sorge F, Pages A, Levy D, et al. Female genital mutilation: an evaluation of the knowledge of French general and specialized travel medicine practitioners. Journal of Travel Medicine. 2018;25(1):01. PubMed PMID: 29394392.

Table 1. Prevalence of Female Genital Mutilation/Cutting (FGM/C) in Women and Girls in Nationally Representative Studies

WHO Region	Country, Survey[§]	Year[§§]	Women 15-49 years			Girls 0-14 years[¶]		
			FGM/C, %	Total number with FGM/C	Sample Size	FGM/C, %	Total number with FGM/C	Sample Size
AFR	Benin, MICS [34]	2014	9.2	1,457	15,815	0.2	20	9,902
	Botswana, Pew study [†*] [31]	2010				5	20	399
	Burkina Faso, DHS [35]	2010	75.8	12,949	17,087	13.3	2,319*	17,434
	Cameroon, Pew study [†*] [31]	2010				1	8	755
	Central African Republic, MICS[36]	2018-2019	21.6	1,983	9,202	1.4	139	9,704
	Chad, MICS [37]	2019	34.1	7,698	22,561	7	1,838	26,303
	Chad, Pew study [†*][31]	2010				39	304	779
	Cote D'Ivoire, MICS [38]	2016	36.7	4,329	11,780	10.9	972	8,909
	Democratic Republic of Congo, Pew study [†*] [31]	2010				9	70	773
	Eritrea, Population and Health Survey [†*][32]	2010	82.9	8,495	10,238	44.1	2,409	5,461
	Ethiopia, DHS [39]	2016	65.2	5,101	7,822	15.7	1,147	7,306
	Ethiopia, Pew study [†*] [31]	2010				33	204	618
	Gambia, DHS[40]	2021	72.6	4,490	6,186	45.9	2,343	5,105
	Ghana, MICS [41]	2018	2.4	341	14,374	0.1	15	12,015
	Ghana, Pew study [†*] [31]	2010				9	63	699[†]
	Guinea, DHS[42]	2018	94.5	10,276	10,874	39.1	3,563	9,122
	Guinea Bissau, MICS [43]	2020	52.1	5,703	10,945	29.7	2,558	8,625
	Guinea-Bissau, Pew study[†*][31]	2010				33	178	539
	Kenya, DHS[44]	2014	21	3,066	14,625	2.8	352	12,388
	Kenya, Pew study [†*][31]	2010				10	76	762
	Liberia, DHS [45][#]	2021	38.2	2,568	6,716			
	Liberia, Pew study [†*][31]	2010				21	182	866
	Mali, DHS [46]	2018	88.6	4,699	5,302	72.7	4,314	5,939
	Mali, Pew study [†*] [31]	2010				77	447	581
	Mauritania, MICS [47]	2015	66.6	9,555	14,342	53.2	6,936	13,048
	Mozambique, Pew study [†*][31]	2010				12	76	631
	Niger, DHS[49]	2012	2	219	11,160			
	Nigeria, DHS [48]	2018	19.5	5,202	26,705	19.2	4,640	24,143
	Nigeria, Pew study [†*] [31]	2010				13	106	813
	Rwanda, Pew study [†*] [31]	2010				3	15	499
	Senegal, DHS[50]	2019	25.2	2,181	8,649	16.1	1,176	7,288
	Senegal, Pew study [†*][31]	2010				4	21	537
	Sierra Leone, DHS[51]	2019	83	12,932	15,574	7.9	946	12,037

Region	Study	Year	Pooled prevalence, %	Number	Total population	Pooled prevalence, %	Number	Total population
	South Africa, Pew study †* [31]	2010				4	33	819
	Tanzania, DHS [52]	2016	10	1,329	13,266	0.4	47	11,795
	Tanzania, Pew study †*[31]	2010				6	64	1,074
	Togo, MICS [53]	2017	3.1	225	7,326	0.3	17	6,077
	Uganda, DHS[54]	2016	0.3	56	18,506			
	Uganda, Pew study †* [31]	2010				13	89	682
	Zambia, Pew study †* [31]	2010				3	13	443
EMR	Djibouti, Pew study †* [31]	2010				58	469	808
	Egypt, DHS ¶¶[55]	2014	92.3	20,086*	21,762	21.4	4,941*	23,090
	Iraq, MICS [56]	2018	7.4	2,270	30,660	0.5	128	24,438
	Somalia, DHS[58]	2020	99.2	14,651	14,771	33.3#	2,492#	7,482#
	Sudan, MICS [57]	2014	86.6	15,853	18,302	31.5	5,570	17,661
	Yemen, DHS †* [33]	2013	18.5	4,705	25,434	15.9†	1,909	12,005
SEAR	Maldives, DHS [59]	2016-2017	12.9	996	7,699	1.1	40*	3,626
	Indonesia, RISKESDAS ††[30]	2013				51.2	NA	NA

Pooled prevalence‡	Women 15-49 years			Girls 0-14 years¶¶		
	Pooled prevalence, % (95% CI)	Estimated total number with FGM/C (95% CI)	Total population[T]	Pooled prevalence, % (95% CI)	Estimated total number with FGM/C (95% CI)	Total population[T]
Global	38.31 (20.8-59.5)	86,080,915 (46,736,701 - 133,693,929)	224,695,680	7.25 (3.1-16.0)	11,982,031 (5,123,351 - 26,476,156)	165,269,394
AFR	32.01 (16.2-53.5)	53,533,504 (28,096,309 - 89,406,470)	167,239,938	7.14 (2.7-17.8)	9,193,035 (3,424,856 - 22,905,335)	128,753,992
EMR	73.68 (21.0-96.7)	42,249,544 (12,041,808 - 56,034,547)	57,341,944	12.02 (2.1-46.7)	4,382,987 (762,100 – 17,014,158)	36,464,121

Abbreviations: AFR: African Region; DHS: Demographic and Health Survey; EMR: Eastern Mediterranean Region; MICS: Multiple Indicator Cluster Surveys; NA: Not available; SEAR: South-East Asia Region; WHO: World Health Organization.

§The Pew study corresponds to the Islam & Christianity in Sub-Saharan Africa Survey, Pew Research Centre.

§§Year of data collection

¶For girls, studies are either reporting (1) the percentage/total number of girls with FGM/C or (2) the percentage/total number of women with at least one daughter with FGM/C.

¶¶In the Egypt DHS 2014 report, the age category of girls is 0 to 19 years.

* The total number with FGM/C was computed using data available in the study/report.

† Excluded from the meta-analyses of girls (0-14 years) as results represent the percentage of women with at least one daughter with FGM/C [31-33]

††Excluded from the meta-analyses of girls (0-14 years) due to insufficient data.

‡No pooled prevalence was calculated for SEAR as data were only available from one country.

ᵀ Population estimates were taken from the United Nations 2019 Revision of World Population Prospects total population estimates for 2020 [29].

#This computed using the dataset as no denominator was provided in the report. #Liberia: among women who have heard of FGM/C.

Table 2. Repeated nationally representative cross-sectional studies reporting the prevalence of Female Genital Mutilation/Cutting (FGM/C) by country

Region	Country	Date of survey	% FGM/C amongst women	Total sample size of women	% FGM/C amongst girls	Total sample size of girls	Survey source
AFR	Benin	2001*	17.0	6,219			DHS
		2006*	12.9	17,793			
		2011-2012	7.3	16,599	0.3	10,671	
		2014	9.2	15,815	0.2	9,902	MICS
	Botswana	2010*			5.0	399	Pew Res Center
	Burkina Faso	1998-1999**	71.6	6,445	45.5	3,499	DHS
		2003*	76.6	12,477	31.6	7,540	
		2006*	72.5	7,316	24.7	4,548	MICS
		2010	75.8	17,087	13.3	17,434	DHS
	Cameroon	2004*	1.4	5,391	0.7	2,975	DHS
		2010*			1.0	755	Pew Res Center
	Central African Republic	1994-95	43.4	5,884			DHS
		2000	35.9	16,941			
		2006*	25.7	11,592	6.6	6,778	MICS
		2010	24.2	11,510	0.8	17,441	
		2018-2019	21.6	9,202	1.4	9,704	
	Chad	2004*	44.9	6,085	20.7	3 893	DHS
		2010	44.2	15,936	12.1	15,936	MICS
		2010*			39.0	779	Pew Res Center
		2014-2015	38.4	11,534	9.9	14,310	DHS
		2019	34.1	22,561	7.0	26,303	MICS
	Côte D'Ivoire	1998-99**	44.5	3,040	25.8	1595	DHS
		2005	41.7	5,183			AIS
		2006	36.0	12,888	9.5		MICS
		2011-2012	38.2	10,060	10.5	8,110	DHS
		2016	36.7	11,780	10.9	8,090	MICS
	Democratic Republic of Congo	2010*			9.0	773	Pew Res Center
	Eritrea	1995**	94.5	5,054	71.4		DHS
		2002*	88.7	8,754	62.5	4,604	
	Ethiopia	2000*	79.9	15,367	51.9	7,659	
		2005*	74.3	14,070	37.7	7,920	DHS
		2010*			33.0	618	Pew Res Center
		2016	65.2	7,822	15.7	7,306	DHS
	Gambia	2005-2006*	78.3	9,982	64.3	5,337	MICS
		2010	76.3	14,685	42.4	16,635	
		2013	74.9	10,233			DHS
		2018	75.7	13,64	50.6	11,718	MICS
		2019-2020	72.6	6,186	45.9	5,105	DHS
	Ghana	2006	3.8	5,890			MICS
		2010*			9.0	699	Pew Res Center
		2011	3.8	10,627	0.4	8,276	MICS
		2017-2018	2.4	14,374	0.1	12,015	
	Guinea	1999*	98.6	6,753	54.4	4,240	
		2005*	95.6	7,954	56.8	4,972	DHS
		2012	96.9	9,142	45.5	8,497	
		2016	96.8	9,663	45.3	8,832	MICS
		2018	94.5	10 874	39.1	9 ,122	DHS
	Guinea Bissau	2006*	44.5	8,010	34.7	4,575	MICS
		2010*	49.8	18,734	38.7	10,563	
		2010*			33.0	539	Pew Res Center
		2014	44.9		29.6		MICS
		2018-2019	52.1	10,945	29.7	8,625	
	Kenya	1998**	37.6	7,881	24.1	1,590	DHS

Country	Year					Source
	2003**	32.2	8,195	21.0	1,577	
	2008-2009	27.1	8,444			
	2010*			10.0	762	Pew Res Center
	2014	21.0	14,625	2.8	12,388	DHS
Liberia	2010*			21.0	866	Pew Res Center
	2019-2020†	38.2	6,716			
Mali	1995-1996**	93.7	9,704	73.6	6,399	DHS
	2001	91.6	12,849	73.0	8,223	
	2006*	85.2	14,583	68.7	9,105	
	2009-2010*	88.5	26,751	74.6		MICS
	2010*			77.0	581	Pew Res Center
	2012-2013	91.4	10,424	69.2	11,857	DHS
	2015	82.7		76.4		MICS
	2018	88.6	5,302	72.7	5 939	DHS
Mauritania	2000-2001*	71.3	7,728	66.2	3,887	DHS
	2007*	72.2	12,549	65.8	6,454	MICS
	2011	69.4	12,754	54.8	10,992	
	2015	66.6	14,342	53.2	13,048	
Mozambique	2010*			12.0	631	Pew Res Center
Nigeria	1999**	25.1	8,206	20.2	4,503	DHS
	2003*	19.0	7,620	9.9	4,129	
	2007*	26.0	24,565	13.3	13,124	MICS
	2008*	29.6	33,385	29.9	11,563	DHS
	2010*			13.0	813	Pew Res Center
	2011	27.0	30,772	19.2	16,874	MICS
	2013	24.8	38,948	16.9	36,308	DHS
	2016-2017	18.4	34,376	25.3	17,529	MICS
	2018	19.5	26,705	19.2	24,143	DHS
Niger	1998*	4.5	7,577	2.5		DHS
	2006*	2.2	9,223	0.9	6,173	DHS
	2012	2.0	11,160			
Rwanda	2010*			3.0	499	Pew Res Center
Senegal	2005*	28.2	14,602	19.5	7,419	
						DHS
	2010*			4.0	537	Pew Res Center
	2010-2011	25.7	15,688	12.9	8,983	DHS
	2012-2013			17.5	7,172	
	2014	24.7	8,488	12.9	7,186	
	2015	24.2	8,851	14.6	7,529	
	2016	22.7	8,865	13.6	7,390	
	2017	24.0	16,787	14.0	14,008	
	2018	23.3	9,414	14.1	7,598	
	2019	25.2	8 649	16.1	7 288	
Sierra Leone	2008*	91.3	7,374	32.5	4,590	DHS
	2010	88.3	13,359	10.2	14,703	MICS
	2013	89.6	16,658			DHS
	2017	86.1	17,873	8.4	12,972	MICS
	2019	83.0	15,574	7.9	12,037	DHS
South Africa	2010*			4.0	819	Pew Res Center
United Republic of Tanzania	1996**	17.9	8,120	6.7	4,753	DHS
	2003-2004	17.7	6,863			
	2004-2005*	14.6	10,329	4.2	6,095	
	2010*	14.6	10,139	3.4	6,075	
	2010*			6.0	1074	Pew Res Center
	2015-2016	10.0	13,266	0.4	11,795	DHS
Togo	2006*	5.8	6,211	1.0	3,431	MICS

Region	Country	Year					Source
		2010	**3.9**	6,379	**0.4**	4,679	
		2013-2014	**4.7**	9,480	**0.3**		DHS
		2017	**3.1**	7,326	**0.3**	6,077	MICS
	Uganda	2006	**0.6**	8,531			DHS
		2010*			**13.0**	682	Pew Res Center
		2011	**1.4**	8,674			DHS
		2016	**0.3**	18,506			
	Zambia	2010*			**3.0**	443	Pew Res Center
EMR	Egypt	1995*	**97.0**	14,779	**49.7**	10,847	DHS
		2000*	**97.3**		**49.5**	11,540	
		2003*	**97.0**	9159	**47.3**	6,587	
		2005	**95.8**	19,474	**27.7**	20,628	
		2008	**91.1**		**24.1**	16,475	
		2014	**92.3**	21,762	**21.4**	23,090	
		2015	**87.2**	7,906	**14.1**	5,280	
	Djibouti	2006*	**93.1**	6,020	**48.5**	1,923	MICS
		2010*			**58.0**	808	Pew Res Center
	Iraq	2011	**8.1**	55,194	**20.6**	8,759	MICS
		2018	**7.4**	30,660	**0.5**	24,438	
	Somalia	2006*	**97.9**	6,764	**46.0**	3,716	MICS
		2020	**99.2**	14,771	**33.3**[#]	7,482[#]	DHS
	Sudan	1989-1990	**89.2**	5,860			DHS
		2010	**88.2**[¶]	16,716	**37.0**	19,084	MICS
		2014	**86.6**	18,302	**31.5**	17,661	
	Yemen	1997*	**22.6**	10,414	**19.7**	7,854	DHS
		2013*	**18.5**	25,434	**15.9**	12,005	
SEAR	Indonesia	2013			**51.2**		RISKESDAS
	Maldives	2016-2017	**12.9**	7,699	**1.1**	3,626	DHS

Abbreviations: AFR: African Region; DHS: Demographic and Health Survey; EMR: Eastern Mediterranean Region; MICS: Multiple Indicator Cluster Surveys; Empty cell: Not available in report; SEAR: South-East Asia Region. *Women with at least one living daughter with FGM/C. **Women reporting whether their eldest daughter had FGM/C. [¶]Age range for women 18-49 years old. [†]Among women who have heard of FGM/C [#]This was computed using the dataset as no denominator was provided in the report. For most countries girls was defined as 0-14 years old; Indonesia (2013) 0-11 years old; Senegal (2010-11) 0-9 years; Egypt (2015) age 1-14 years old; Egypt (2014) 0-19 years old; Egypt (2008 & 2005) 0-17 years old.

Table 3. Types of Female Genital Mutilation/Cutting (FGM/C) in Nationally Representative Studies

WHO Region	Country, Survey	Year[§]	Women 15-49 years					Girls 0-14 years					
			Prevalence FGM/C, n (%)	Type of FGM/C, % [§§]				Prevalence FGM/C, n (%)	Type of FGM/C, % [§§]				
				Nicked	Flesh removed	Sewn closed	Don't Know/ Missing Type		Nicked	Not Sewn Closed	Flesh removed	Sewn closed	Don't Know/ Missing Type
AFR	Benin, MICS[34]	2014	1,457 (9.2)	14.5	72.1	10.1	3.4	20 (0.2)					
	Burkina Faso, DHS[35]	2010	12,949 (75.8)	16.6	76.8	1.2	5.4	2,319 (13.3)					
	Central African Republic, MICS[36]	2018-2019	1,983 (21.6)	0.8	47.6	49.6	2	139 (1.4)	0.2		38.6	59.2	2.0
	Chad, MICS[37]	2019	7,698 (34.1)	5.5	71.9	15.8	6.8	1,838 (7.0)	4.4		73.6	18.5	3.5
	Cote D'Ivoire, MICS[38]	2016	4,329 (36.7)	6.8	63.3	9.4	20.5	972 (10.9)	6.3		78.4	10.4	4.9
	Ethiopia, DHS [39]	2016	5,101 (65.2)	2.6	73	6.5	17.9	1,147 (15.7)		90.1		9.3	0.6
	Gambia, DHS[40]	2021	4,490 (72.6)	1.4	73.4	16.6	8.7	2,343 (45.9)		67.8		15.2	17.1
	Ghana, MICS [41]	2018	341 (2.4)	4.6	63.6	15.9	15.9	15 (0.1)			74.5	20.2	5.2
	Guinea, DHS[42]	2018	10,276 (94.5)	11	57.7	9.7	21.6	3,563 (39.1)		84.2		15.8	
	Guinea Bissau, MICS[43]	2020	5,703 (44.5)	1.1	73.8	18.5	6.5	2,558 (29.7)	1.5		84.1	13.4	3.6
	Kenya, DHS[44]	2014	3,066 (21)	1.6	87.2	9.3	1.9	352 (2.8)		86.3		7.8	5.9
	Mali, DHS[46]	2018	4,699 (88.6)	25.4	40.7	8.2	25.8	4,314 (72.7)		88.6		11.4	
	Mauritania, MICS[47]	2015	9,555 (66.6)	1.2	64.9	4.5	29.4	6,936 (53.2)	1.0		75.2	4.2	19.6
	Niger, DHS[49]	2012	219 (2.0)	7.2	78.4	6.3	8.1						
	Nigeria, DHS[48]	2018	5,202 (19.5)	9.6	40.7	5.6	44.1	4,640 (19.2)		96.5		3.5	
	Senegal, DHS[50]	2019	2,181(25.2)	9.2	57.7	9.1	24.0	1,176 (16.1)		84.3		5.1	10.6
	Sierra Leone, DHS[51]	2020	12,932 (83.0)	0.7	84	11.9	3.3	946 (7.9)		83.3		15.9	0.8
	Tanzania, DHS [52]	2016	1,329 (10.0)	3.2	81.1	6.6	9.1						
	Togo, MICS[53]	2017	225 (3.1)	6.3	54	36.2	3.5						
EMR	Iraq, MICS[56]	2018	2,270 (7.4)	6	84.3	1.3	8.4	128 (0.5)	9.1		88.8	1.0	1.1
	Somalia, DHS[58]	2020	14,651 (99.2)		33.9[¶]	64.2[¶]	1.9						
	Sudan, MICS [57]	2014	15,853 (86.6)	2.2	16.3	77	4.5	5,570 (31.5)					
	Yemen, DHS[33]	2013	4,705(18.5)	7	89.7	NA	3.3	1,909 (15.9)[†]	10.7[††]	88.3[††]			1.0[††]

Abbreviations: AFR: African Region; DHS: Demographic and Health Survey; EMR: Eastern Mediterranean Region; MICS: Multiple Indicator Cluster Surveys; WHO: World Health Organization.
[§]Year of data collection

§§ Percentages of types from women and girls are calculated from the total number of women and girls with FGM/C, respectively

¶ Type I, Sunni= 21.6% and Type II, Intermediate = 12.3%

¶¶ Type III and IV= 64.2%

† Prevalence and total number with FGM/C correspond to those of women with at least one daughter with FGM/C.

†† Percent distribution of most recent daughters who had FGM/C

Table 4. Characteristics of Female Genital Mutilation/Cutting (FGM/C) Procedure in Nationally Representative Studies

WHO Region	Country, Survey	Year[§]	Percent distribution of women 15-49 years by:		Percent distribution of girls 0-14 years by:	
			Age at FGM/C (%)	Performer of FGM (%)	Age at FGM/C (%)	Performer of FGM (%)
AFR	Burkina Faso, DHS[35]	2010	<5y (60.4%), 5-9y (28.2%), 10-14y (8.9%), 15+y (2.0%), Don't know/missing (0.5%)	Traditional (97.2%) Medical (0.2%) Don't know/missing (2.6%)	<1y (2.8%), 1-4y (7.3%), 5-9y (3.1%), 10-14y (0.1%), Don't know/missing (0.1%)	Traditional (98.3%) Medical (0.2%) Don't know/missing (1.5%)
	Eritrea, Population and Health Survey [32]	2010	<1y (47.4%), 1-3y (4.7%)	Traditional (84.4%) Medical (0.3%) Other (15.4%)	<1y (65.7%), 1-4y (20.9%), 5-6y (8.1%), 7-8y (4.3%), 9-10y (0.4%), 11-12y (0.1%) 13+y (0.1%), Don't know/missing (0.4%)	Traditional (98.3%) Medical (0.09%) Don't know/missing (1.6%)
	Ethiopia, DHS [39]	2016	<5y (48.6%), 5-9y (21.7%), 10-14y (18.0%), 15+y (5.9%), Don't know/missing (5.8%)	Traditional (90.1%) Medical (1%) Don't know/missing (8.9%)	<1y (7.2%), 1-4y (3.4%), 5-9y (3.7%), 10-14y (1.0%), Don't know/missing (0.3%)	Traditional (97.6%) Medical (1.9%) Don't know/missing (0.5%)
	Kenya, DHS [44]	2014	<5y (2.3%), 5-9y (26.6%), 10-14y (42.6%), 15+y (26.9%), Don't know /missing (1.7%)	Traditional (83.3%) Medical (14.8%) Don't know/missing (1.9%)	<1y (0.0%), 1-4y (0.2%), 5-9y (2.1%), 10-14y (0.5%)	Traditional (74.9%), Medical (19.7%) Don't know/missing (5.4%).
	Mali, DHS [46]	2018	<5y (75.5%), 5–9y (16.1%), 10-14y (4.4%). 15+y (0.3%), Don't know missing (3.6%)	Traditional (91.5%) Medical (0.3%) Don't know/missing (8.2%)	<1y (34.2%), 1-4y (31.9%), 5-9 (5.2%), 10-14y (0.4%), Don't know/missing (0.9%)	Traditional (98.6%) Medical (1.4%)
	Nigeria, DHS [48]	2018	<5y (85.6%), 5-9y (4.2%), 10-14y (3.9%), 15+y (4.5%), Don't know/missing (1.8%)	Traditional (85.4%) Medical (8.6%) Don't know/missing (6%)	<1y (17.2%), 1-4y (1.1%), 5-9 (0.7%), 10-14y (0.0%), Don't know/missing (0.1%)	Traditional (92.8%) Medical (7%) Don't know/missing (0.1%)
	Niger, DHS[49]	2012	<5y (75.7%), 5-9y (7.3%), 10-14y (7.9%), 15+y (1.4%), Don't know/missing (7.8%)	Traditional (95.8%) Other (0.2%) Don't know/missing (4%)		
	Senegal, DHS [50]	2019	<5y (84.9%), 5-9y (10.4%), 10-14y (2.7%), 15+y (0.4%), Don't know /missing (1.7%)	Traditional (100%)	<1y (9.8%), 1-4y (5.4%), 5-9y (0.8%), 10-14y (0.0%), Don't know/missing (0.1)	Traditional (100%)
	Sierra Leone, DHS [51]	2019	<5y (12.3%), 5-9y (14.1%), 10-14y (44.9%), 15+y (26.1%), Don't know /missing (2.5%)	Traditional (98.4%) Medical (0.4%) Don't know/missing (1.2%)	< 1y (0.0%), 1-4y (0.6%), 5-9y (4.1%), 10-14y (3.1%), Don't know/missing (0.1%)	Traditional (99.4%) Medical (0.6%)
	Guinea, DHS[42]	2018	<5y (22.4%), 5-9y (36.7%), 10-14y (28.4%), 15+y (3.9%), Don't know/missing (8.6%)	Traditional (77.6%) Medical (17.3%) Don't know/missing (5.1%)	<1y (1.5%), 1-4y (11.9%), 5-9y (22.7%), 10-14y (2.3%), Don't know/missing (0.8%)	Traditional (64.8%) Medical (34.9%) Don't know/missing (0.3%)
	Liberia, DHS[45]	2020	<5y (24.6%), 5-9y (16.7%), 10-14y (33%), 15+y (21.6%), Don't know (4.1%)			
	Gambia, DHS[40]	2021	<5y (64.9%), 5-9y (17.7%), 10-14y (6%), 15+y (0.7%), Don't	Traditional (95.1%) Medical (0.4%)	<1y (21.9%), 1-4y (19.4%), 5-9y (3.9%), 10-14y (0.2%), Don't know	Traditional (98.8%) Medical (0.1%),

			know /missing (10.6%)	Don't know/missing (4.5%)	(4.5%)	Don't know/missing (1.1%)
	Tanzania, DHS[52]	2016	<1y (35.4%), 1-4y (2.3%), 5-6y (5.2%), 7-8y (7.5%), 9-10y (10.9%), 11-12y (9.3%), 13+y (27.6%), Don't know/missing (1.8%)	Traditional (86%) Medical (14.8%) Don't know/missing (1.9%)	<1y (0.1%), 1-4y (0.2%), 5-9y (0.1%), 10-14y (0.1%)	Traditional (74.9%) Medical (19.7%) Don't know/missing (5.4%)
EMR	Egypt, DHS[55]	2014	<3y (0.6%), 3-4y (1%), 5-6y (7.4%), 7-8y (13.4%), 9-10y (40.9%) 11-12y (24.6%), 13-14y (5.3%), 15-17y (2.6%), 18-19y (0.1%), Don't know/missing (4.2%)	Traditional (60.5%) Medical (37.9%) Other (0.1%), Don't know/missing (1.5%)	<3 y (3.5%); 3-4y (3.4%), 5-6y (10.1%), 7-8y (14.1%), 9-10y (32.8%) 11-12y (28.6%), 13-14y (5.4%), 15-17y (1.3%), Don't know /missing (0.7%)	Medical (81.9%) Traditional (18.1%) Don't know/missing (0.3%)
	Somalia, DHS [58]	2020	<5y (0.2%), 5-9y (70.9%), 10-14y (27.7%), 15+y (0.7%), Don't know /missing (0.5%)		0-4y (3.3%), 5-9y (29.7%), 10-14y (75.9%)	
	Yemen, DHS [33]	2013	First week after birth (83.8%), after first week but before first year (10.5%), >=1y (1.2%), Don't know /missing (4.5%)	Traditional (92.8%) Medical (2.9%) Don't know/missing (4.3%)	First week after birth (84.9%), after 1st week but before 1 year (14.3%), >=1y (0.6%), Don't know/missing (0.2%)	Traditional (84.7%) Medical (12.8%) Don't know/missing (2.5%)
SEAR	Indonesia, RISKESDAS [30]	2013			1-5 months (72.4%), 1-4y (13.9%), 5-11 y (3.3%)	
	Maldives, DHS[149]	2016-2017	<5y (83.1%), 5-9y (1.6%), 10-14y (0.4%), 15+y (0.4%), Don't know/missing (14.5%)		<1y (0.7%), 1-4y (0.2%), Don't know/missing (0.1%)	

Abbreviations: AFR: African Region; DHS: Demographic and Health Survey; EMR: Eastern Mediterranean Region; MICS: Multiple Indicator Cluster Surveys; WHO: World Health Organization; y: years.

§Year of data collection

PRISMA Flow Diagram

Identification

Records identified through database searching
(n = 6010) [last search March 24, 2022]
Embase: (n=1997)
MEDLINE: (n=1364)
Pubmed: (n=1322)
PSYCINFO: (n=374)
Web of Science: (n=953)

Additional records identified through other sources
(n=80)

Screening

Records after duplicates removed (n=2913)

Records screened (n=2913)

Records excluded (n=2496)

Eligibility

Full-text articles assessed for eligibility
(n=417)

Full-text articles excluded, with reasons (n =256)
Estimates (n=23)
Cannot be locted (n=2)
Repeated survey/not most recent data (n=83)
Duplicates (n=29)
Excluded publication type (n=70)
Outcomes/perceptions/risk factors i.e. no prevalence (n=49)

Studies included systematic review: n = 161

Included

Nationally representative studies included in the meta-analysis
(n=28)
Other:
Nationally representative (not included in meta-analysis) (n=2)
Sub-regionally representative (n=33)
Community, facility or school based studies(n=54)
          Of which had migrant populations (n=44)

Study		Proportion	95%-CI
DHS 2020 - Somalia		0.99	[0.99; 0.99]
DHS 2019 - Guinea		0.95	[0.94; 0.95]
DHS 2015 - Egypt		0.92	[0.92; 0.93]
DHS 2019 - Mali		0.89	[0.88; 0.89]
MICS 2016 - Sudan		0.87	[0.86; 0.87]
DHS 2020 - Sierra Leone		0.83	[0.82; 0.84]
Population and Health Survey 2013 - Eritrea		0.83	[0.82; 0.84]
DHS 2012 - Burkina Faso		0.76	[0.75; 0.76]
DHS 2021 - Gambia		0.73	[0.71; 0.74]
MICS 2017 - Mauritania		0.67	[0.66; 0.67]
DHS 2017 - Ethiopia		0.65	[0.64; 0.66]
MICS 2020 - Guinea Bissau		0.52	[0.51; 0.53]
DHS 2021 - Liberia		0.38	[0.37; 0.39]
MICS 2017 - Cote D'Ivoire		0.37	[0.36; 0.38]
MICS 2021 - Chad		0.34	[0.34; 0.35]
DHS 2020 - Senegal		0.25	[0.24; 0.26]
MICS 2021 - Central African Republic		0.22	[0.21; 0.22]
DHS 2015 - Kenya		0.21	[0.20; 0.22]
DHS 2019 - Nigeria		0.19	[0.19; 0.20]
DHS 2015 - Yemen		0.18	[0.18; 0.19]
DHS 2018 - Maldives		0.13	[0.12; 0.14]
DHS 2016 - Tanzania		0.10	[0.10; 0.11]
MICS 2015 - Benin		0.09	[0.09; 0.10]
MICS 2018 - Iraq		0.07	[0.07; 0.08]
MICS 2018 - Togo		0.03	[0.03; 0.03]
MICS 2018 - Ghana		0.02	[0.02; 0.03]
DHS 2013 - Niger		0.02	[0.02; 0.02]
DHS 2018 - Uganda		0.00	[0.00; 0.00]
Random effects model		**0.38**	**[0.21; 0.60]**
Prediction interval			**[0.00; 0.99]**

Heterogeneity: I^2 = 100%, τ^2 = 5.4019, p = 0

0.2 0.4 0.6 0.8

Study		Proportion	95%-CI
DHS 2019 - Mali		0.73	[0.71; 0.74]
MICS 2017 - Mauritania		0.53	[0.52; 0.54]
DHS 2021 - Gambia		0.46	[0.45; 0.47]
DHS 2019 - Guinea		0.39	[0.38; 0.40]
SDHS 2020 - Somalia		0.33	[0.32; 0.34]
MICS 2016 - Sudan		0.33	[0.32; 0.33]
MICS 2020 - Guinea Bissau		0.30	[0.29; 0.31]
DHS 2015 - Egypt		0.21	[0.21; 0.22]
DHS 2019 - Nigeria		0.19	[0.19; 0.20]
DHS 2020 - Senegal		0.16	[0.15; 0.17]
DHS 2017 - Ethiopia		0.16	[0.15; 0.17]
DHS 2012 - Burkina Faso		0.13	[0.13; 0.14]
MICS 2017 - Cote D'Ivoire		0.11	[0.10; 0.12]
DHS 2020 - Sierra Leone		0.08	[0.07; 0.08]
MICS 2021 - Chad		0.07	[0.07; 0.07]
DHS 2015 - Kenya		0.03	[0.03; 0.03]
MICS 2021 - Central African Republic		0.01	[0.01; 0.02]
MICS 2019 - Iraq		0.01	[0.00; 0.01]
DHS 2018 - Maldives		0.01	[0.01; 0.01]
DHS 2016 - Tanzania		0.00	[0.00; 0.01]
MICS 2018 - Togo		0.00	[0.00; 0.00]
MICS 2015 - Benin		0.00	[0.00; 0.00]
MICS 2018 - Ghana		0.00	[0.00; 0.00]
Random effects model		**0.07**	**[0.03; 0.16]**
Prediction interval			**[0.00; 0.89]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 4.7567$, $p = 0$

0.2   0.4   0.6   0.8

Study		Proportion	95%-CI
DHS 2019 - Nigeria		0.63	[0.62; 0.64]
DHS 2019 - Mali		0.25	[0.24; 0.27]
DHS 2012 - Burkina Faso		0.17	[0.16; 0.17]
MICS 2015 - Benin		0.14	[0.13; 0.16]
DHS 2019 - Guinea		0.11	[0.10; 0.12]
DHS 2020 - Senegal		0.09	[0.08; 0.11]
DHS 2013 - Niger		0.07	[0.04; 0.12]
DHS 2015 - Yemen		0.07	[0.06; 0.08]
MICS 2017 - Cote D'Ivoire		0.07	[0.06; 0.08]
MICS 2018 - Togo		0.06	[0.03; 0.10]
MICS 2018 - Iraq		0.06	[0.05; 0.07]
MICS 2021 - Chad		0.06	[0.05; 0.06]
MICS 2018 - Ghana		0.05	[0.03; 0.08]
DHS 2017 - Ethiopia		0.03	[0.02; 0.03]
DHS 2016 - Tanzania		0.03	[0.02; 0.04]
MICS 2016 - Sudan		0.02	[0.02; 0.02]
DHS 2015 - Kenya		0.02	[0.01; 0.02]
MICS 2017 - Mauritania		0.01	[0.01; 0.01]
DHS 2021 - Gambia		0.01	[0.01; 0.02]
MICS 2020 - Guinea Bissau		0.01	[0.01; 0.01]
DHS 2020 - Sierra Leone		0.01	[0.01; 0.01]
MICS 2021 - Central African Republic		0.01	[0.00; 0.01]
Random effects model		**0.05**	**[0.03; 0.08]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 1.6821$, $p = 0$

0.1   0.2   0.3   0.4   0.5   0.6

Study		Proportion	95%-CI
DHS 2015 - Yemen		0.90	[0.89; 0.91]
DHS 2015 - Kenya		0.87	[0.86; 0.88]
MICS 2018 - Iraq		0.84	[0.83; 0.86]
DHS 2020 - Sierra Leone		0.84	[0.83; 0.85]
DHS 2016 - Tanzania		0.81	[0.79; 0.83]
DHS 2013 - Niger		0.79	[0.73; 0.84]
DHS 2012 - Burkina Faso		0.77	[0.76; 0.78]
MICS 2020 - Guinea Bissau		0.74	[0.73; 0.75]
DHS 2021 - Gambia		0.73	[0.72; 0.75]
DHS 2017 - Ethiopia		0.73	[0.72; 0.74]
MICS 2021 - Chad		0.72	[0.71; 0.73]
MICS 2014 - Benin		0.72	[0.70; 0.74]
MICS 2017 - Mauritania		0.65	[0.64; 0.66]
MICS 2018 - Ghana		0.64	[0.58; 0.69]
MICS 2017 - Cote D'Ivoire		0.63	[0.62; 0.65]
DHS 2019 - Guinea		0.58	[0.57; 0.59]
DHS 2020 - Senegal		0.58	[0.56; 0.60]
MICS 2018 - Togo		0.54	[0.47; 0.60]
MICS 2021 - Central African Republic		0.48	[0.45; 0.50]
DHS 2019 - Mali		0.41	[0.39; 0.42]
DHS 2019 - Nigeria		0.41	[0.39; 0.42]
DHS 2020 - Somalia		0.22	[0.21; 0.22]
MICS 2016 - Sudan		0.16	[0.16; 0.17]
Random effects model		**0.66**	**[0.57; 0.74]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 0.8736$, $p = 0$

0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9

Study		Proportion	95%-CI
MICS 2016 - Sudan		0.77	[0.76; 0.78]
DHS 2021 - Somalia		0.64	[0.63; 0.65]
MICS 2021 - Central African Republic		0.50	[0.47; 0.52]
MICS 2018 - Togo		0.36	[0.30; 0.43]
MICS 2020 - Guinea Bissau		0.18	[0.17; 0.20]
DHS 2021 - Gambia		0.17	[0.16; 0.18]
MICS 2018 - Ghana		0.16	[0.12; 0.20]
MICS 2021 - Chad		0.16	[0.15; 0.17]
DHS 2020 - Sierra Leone		0.12	[0.11; 0.12]
DHS 2019 - Guinea		0.10	[0.09; 0.10]
MICS 2015 - Benin		0.10	[0.09; 0.12]
MICS 2017 - Cote D'Ivoire		0.09	[0.09; 0.10]
DHS 2015 - Kenya		0.09	[0.08; 0.10]
DHS 2020 - Senegal		0.09	[0.08; 0.10]
DHS 2019 - Mali		0.08	[0.07; 0.09]
DHS 2016 - Tanzania		0.07	[0.05; 0.08]
DHS 2017 - Ethiopia		0.07	[0.06; 0.07]
DHS 2013 - Niger		0.06	[0.04; 0.10]
DHS 2019 - Nigeria		0.06	[0.05; 0.06]
MICS 2017 - Mauritania		0.04	[0.04; 0.05]
DHS 2012 - Burkina Faso		0.01	[0.01; 0.01]
MICS 2018 - Iraq		0.01	[0.01; 0.02]
Random effects model		**0.12**	**[0.07; 0.19]**

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 1.7424$, $p = 0$

0.1 0.2 0.3 0.4 0.5 0.6 0.7