Female genital mutilation and cutting: a systematic literature review of health professionals’ knowledge, attitudes and clinical practice

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Abstract

Background: The World Health Organisation (WHO) estimates that 100–140 million girls and women have undergone female genital mutilation or cutting (FGM/C). FGM/C is an ancient cultural practice prevalent in 26 countries in Africa, the Middle East and Asia. With increased immigration, health professionals in high income countries including UK, Europe, North America and Australia care for women and girls with FGM/C. FGM/C is relevant to paediatric practice as it is usually performed in children, however, health professionals’ knowledge, clinical practice, and attitudes to FGM/C have not been systematically described. We aimed to conduct a systematic review of the literature to address this gap.

Methods: The review was conducted according to guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and registered with the PROSPERO International Prospective Register of Systematic Reviews (CRD42015015540, http://www.crd.york.ac.uk/PROSPERO/). Articles published in English 2000–2014 which used quantitative methods were reviewed.

Results: Of 159 unique articles, 18 met inclusion criteria. The methodological quality was poor - six studies met seven of the eight quality criteria. Study participants included mainly obstetricians, gynaecologists and midwives (15 studies). We found no papers that studied paediatricians specifically, but two papers reported on subgroups of paediatricians within a mixed sample of health professionals. The 18 articles covered 13 different countries: eight from Africa and 10 from high income countries. Most health professionals were aware of the practice of FGM/C, but few correctly identified the four FGM/C categories defined by WHO. Knowledge about FGM/C legislation varied: 25 % of professionals in a Sudanese study, 46 % of Belgian labour ward staff and 94 % of health professionals from the UK knew that FGM/C was illegal in their country. Health professionals from high income countries had cared for women or girls with FGM/C. The need to report children with FGM/C, or at risk of FGM/C, to child protection authorities was mentioned by only two studies.

Conclusion: Further research is needed to determine health professionals’ attitudes, knowledge and practice to support the development of educational materials and policy to raise awareness and to prevent this harmful practice.

Keywords: Female genital mutilation or cutting, Health professionals, Knowledge, Attitudes, Practice

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Background

The World Health Organisation (WHO) estimates that between 100–140 million girls and women have undergone female genital mutilation or cutting (FGM/C) [1]. FGM/C is usually performed in children aged between 1 month and 15 years, and is therefore relevant to paediatric practice [2]. There are different types of FGM/C procedures ranging from “nicking” or “pricking” the prepuce, to complete removal of the clitoris or infibulation, when the vaginal opening is narrowed by cutting and repositioning the inner or outer, labia, with or without removal of the clitoris [1, 3]. FGM/C is an ancient cultural practice, predating both the Bible and the Koran and has no basis in religion [4]. FGM/C is currently customary in over 26 countries in Africa, the Middle East and Asia, with a prevalence of 70 % or more reported in 11 African countries including Somalia, Egypt, Sierra Leone, Sudan, Mali, Eritrea, and Ethiopia [2]. There are no medical or health indications for FGM/C. FGM/C is harmful and immediate complications include bleeding, pain, infections and significant psychological trauma [1, 2, 5, 6]. Long term complications include recurrent urinary infections, birth difficulties including need for emergency caesarean section, third-degree vaginal tears, and ongoing psychological and sexual problems [1, 2, 4–8].

All forms of FGM/C whether performed by medical practitioners or other “cultural practitioners” are illegal in at least 20 countries in Africa including Kenya, Nigeria and Egypt [9], and in high income countries such as Australia, New Zealand, United Kingdom, Republic of Ireland, Canada, many European Countries, and 15 of the 52 States of the USA have law where parents/guardians and circumcisers are subject to prosecution [4–6, 10–12]. Furthermore, it is illegal to organise for FGM/C procedures to be performed overseas in children resident in many of these high income countries [5–7, 10, 12]. FGM/C is a child protection issue and in many countries, mandatory reporting to authorities is required by health professionals who identify children who have undergone FGM/C or who are believed to be at risk of FGM/C [4–7, 10–12]. FGM/C violates the UN Charter of Human Rights, the UN Charter of Women’s Rights, the Charter of the Rights of the Child, and the Charter of Rights of the African Child [13–16].

Medicalization of FGM/C refers to the procedure being performed in a medical setting, often by a doctor [17, 18]. A recent study from the UK reported that of 27 girls who had FGM/C, it was known to have been performed by a doctor in a medical setting in 71 % [19]. Medicalization is often supported by those who practice FGM/C because they believe it offers “harm reduction” by preventing immediate medical complications [17, 18]. However, the involvement of healthcare providers in FGM/C in any setting has been condemned by the WHO because it does not prevent long-term medical or psychological complications and legitimises continuation of FGM/C in some communities [1, 3].

Many women with FGM/C and girls at risk of FGM/C are now living in the UK, Europe, North America, Australia and New Zealand due to the increasing immigration from countries where FGM/C is prevalent [4–7, 10–12]. The prevalence of FGM/C in girls and women living in these countries is unknown, because procedures tend to be organised by families in private, often outside the mainstream health system, and information about FGM/C is not routinely collected or coded in medical records. Furthermore, girls may be taken for FGM/C to the family’s country of origin [5]. Thus, FGM/C may only become apparent to health professionals when girls or young women present with complications, or when women need obstetric and gynaecological care [5, 7, 20].

As the immigrant communities in high income countries become larger and increasingly multicultural and ethnically diverse, health professionals are more likely to see women and girls with FGM/C or at risk of FGM/C, in their clinical practice. In this systematic review of the literature we aimed to identify, describe and analyse publications reporting the knowledge, attitudes and clinical practices related to FGM/C among health professionals internationally. We aimed to answer the following questions:

1. Do health professionals have experience of FGM/C in their clinical practice?
2. Do health professionals have adequate knowledge about FGM/C categories, complications, and high risk groups and do they have access to education and training opportunities?
3. Do health professionals have adequate knowledge about laws relating to FGM/C?
4. What are the attitudes and beliefs of health professionals towards the practice of FGM/C?

Methods

Systematic review of the literature using the terms “female genital mutilation”, “female genital cutting” or “female circumcision” combined with MESH terms: “Paediatrics”, “Child Health” and keywords: “paediatrician”, “practice guidelines,” “attitudes” “knowledge” and “education” was conducted. Databases including MEDLINE, CINHAL and SCOPUS were searched applying limits: year of publication 2000–2014; human; English language.

The review was conducted according to guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and registered with the PROSPERO International Prospective
Register of Systematic Reviews (CRD42015015540, http://www.crd.york.ac.uk/PROSPERO/).

The titles and abstracts of all articles identified through the literature search were scanned for relevance. Documents were selected for full review if they specifically mentioned FGM/C, and reported primary data on health professionals’ knowledge attitudes and clinical practice related to FGM/C.

Definitions

**WHO definitions of the 4 types of FGM/C:**

1. **Clitoridectomy:** partial or total removal of the clitoris (a small, sensitive and erectile part of the female genitals) and, in very rare cases, only the prepuce (the fold of skin surrounding the clitoris).

2. **Excision:** partial or total removal of the clitoris and the labia minora, with or without excision of the labia majora (the labia are “the lips” that surround the vagina).

3. **Infibulation:** narrowing of the vaginal opening through the creation of a covering seal. The seal is formed by cutting and repositioning the inner, or outer, labia, with or without removal of the clitoris.

4. **Other:** all other harmful procedures to the female genitalia for non-medical purposes, e.g. pricking, piercing, incising, scraping and cauterizing the genital area.

Other definitions:

5. **De-infibulation:** is the surgical procedure to open up the closed vagina of FGM type 3 and is often performed on the wedding night, and prior to childbirth.

6. **Reinfibulation:** The re-stitching of FGM type III to reclose the vagina after childbirth.

**Inclusion criteria**

**Design**

Human observational studies, including cross sectional, cohort or population-based studies that used quantitative methodology.
| Reference | Country | Study design and method | Domains assessed | Sample | N | Response rate |
|-----------|---------|-------------------------|-----------------|--------|---|---------------|
| Ashimi et al. 2014 [21] | Nigeria | Cross-sectional; self-administered survey | Yes, Yes, No | Nurses | 350 | 84 % |
| Kaplan et al. 2013 [22] | Gambia | Cross-sectional; survey administered face to face | Yes, Yes, Yes | Nurses, community nurses and midwives | 468 | NR |
| Ali et al. 2012 [23] | Sudan | Survey administered via face to face interview | Yes, Yes, Yes | Midwives (~63 % of midwives were illiterate) | 157 | NR |
| Dike et al. 2012 [24] | Nigeria | Cross-sectional survey | Yes, Yes, No | Student nurses and midwives | 269 | 95.7 % |
| Rasheed et al. 2011 [25] | Egypt | Cross sectional; self-administered survey | Yes, No, Yes | Physicians; junior and senior physicians | 193 | 68 % |
| Refaat 2009 [26] | Egypt | Cross-sectional survey | Yes, Yes, Yes | Physicians | 193 | 68 % |
| Mostafa et al. 2006 [27] | Egypt | Random sample; Survey | Yes, Yes, No | 5th year medical students | 330 | 90.3 % |
| Onuh et al. 2006 [28] | Nigeria | Cross-sectional; Survey | Yes, Yes, Yes | Nurses practising in a hospital | 182 | 94.3 % |
| Caroppo et al. 2014 [29] | Italy | Purposive sample; Self-administered survey | No, Yes, Yes | Physicians, social workers, psychologists, “health assistants” working in an asylum seeker centre | 41 | 100 % |
| Purchase et al. 2013 [30] | UK | Cross-sectional; survey | No, Yes, No | Obstetricians and Gynaecologists | 607 | 20.1 % |
| Relph et al. 2013 [31] | UK | Cross-sectional; Survey | Yes, Yes, No | Health care professionals | 79 | 92.9 % |
| Moeed et al. 2012 [20] | Australia and New Zealand | Cross-sectional; Survey | No, Yes, Yes | Obstetricians and Gynaecologists and trainees | 564 | 18.5 % |
| Hess et al. 2010 [32] | USA | Randomised Survey | Yes, Yes, Yes | Nurse-midwives | 243 | 40.3 % |
| Kaplan-Marcusan et al. 2009 [33] | Spain | Cross-sectional; Survey at two time points (2001 and 2004) | Yes, Yes, Yes | Primary health care professionals | 280 (2001) | 80 % (2001) |
| | | | | | 296 (2004) | 62 % (2004) |
| Leye 2008 [34] | Belgium | Cross-sectional; Survey | Yes, Yes, Yes | Gynaecologists and trainees | 333 | 46 % |
| Zaidi et al. 2007 [35] | UK | Cross-sectional; Survey | No, Yes, Yes | Labour ward staff | 45 | 100 % |
| Tamaddon et al. 2006 [36] | Sweden | Cross-sectional; Survey | No, Yes, Yes | Health professionals | 796 | 28 % |
| Jager et al. 2002 [37] | Switzerland | Cross-sectional; Survey | No, Yes, Yes | Obstetricians and gynaecologists | 454 | 39.1 % |

*Sample included paediatricians but did not report on paediatricians separately;
*Sample included paediatricians and paediatricians were compared with other professionals;
NA Not applicable;
NR Not Reported
Participants
Health professionals including paediatricians, obstetricians, gynaecologists, family doctors, nurses, midwives or students of medicine, nursing, midwifery or other health disciplines.

Outcomes
Measures of knowledge about FGM/C, attitudes/beliefs towards FGM/C and experience of FGM/C in clinical practice.

Exclusion criteria
- Publications reporting patient or community knowledge or attitudes
- Publications that used qualitative study designs
- Publications reporting on genital cosmetic procedures
- Foreign language publications

Quality assessment
Publications were assessed and scored for representativeness and survey tool validity. Quality measures included: sample description (1 point for each detail provided: profession, age, gender of respondents and response rate); sampling method (description of site/setting – 1 point, sampling procedure described - 1 point); and survey validity (1 point if survey pre-tested and 1 point if the survey was reviewed by content experts), for a maximum score of eight points.

Results
One hundred and fifty nine potentially relevant articles were identified. After exclusion of duplicates there remained 122 unique publications. Editorials, letters, notes and publications that did not have abstracts (mainly opinion pieces) were excluded, leaving 109

Table 2 Assessment of methodological quality of studies included in the review

| Reference                  | Representativeness | Age or years of practice | Gender | Setting | Sampling procedure | Response rate reported | Survey validity | Score out of 8 |
|----------------------------|--------------------|--------------------------|--------|---------|--------------------|------------------------|-----------------|----------------|
| **Publications from African Countries** |                    |                          |        |         |                    |                        |                 |                |
| Ashimi et al. 2014 [21]    | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | Yes             | No             | 7              |
| Kaplan et al. 2013 [22]    | Yes                | Yes                      | Yes    | Yes     | No                 | No                     | No              | Yes            | 7              |
| Ali et al. 2012 [23]       | Yes                | Yes                      | No*    | Yes     | No                 | No                     | No              | No             | 3              |
| Dike et al. 2012 [24]      | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | Yes             | No             | 7              |
| Rasheed et al. 2011 [25]   | Yes                | No                       | No     | Yes     | No                 | No                     | No              | No             | 3              |
| Refaat 2009 [26]           | Yes                | Yes                      | Yes    | No      | Yes                | Yes                    | No              | No             | 5              |
| Mostafa et al. 2006 [27]   | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | No              | No             | 6              |
| Onuh et al. 2006 [28]      | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | Yes             | No             | 7              |
| **Publications from “Western Countries”** |                    |                          |        |         |                    |                        |                 |                |
| Caroppo et al. 2014 [29]   | Yes                | No                       | Yes    | Yes     | Yes                | Yes                    | No              | No             | 5              |
| Purchase et al. 2013 [30]  | Yes                | Yes                      | No     | Yes     | Yes                | Yes                    | No              | No             | 5              |
| Relph et al. 2013 [31]     | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | Yes             | No             | 7              |
| Moeed et al. 2012 [20]     | Yes                | No                       | No     | No      | Yes                | Yes                    | No              | No             | 3              |
| Hess et al. 2010 [32]      | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | No              | Yes            | 7              |
| Kaplan-Marcusan et al. 2009 [33] | Yes            | Yes                      | Yes    | Yes     | Yes                | Yes                    | No              | No             | 6              |
| Leye 2008 [34]             | Yes                | Yes                      | Yes    | Yes     | Yes                | Yes                    | Yes             | Yes            | 8              |
| Zaidi et al. 2007 [35]     | Yes                | No                       | No     | Yes     | Yes                | Yes                    | No              | Yes            | 5              |
| Tamaddon et al. 2006 [36]  | Yes                | No                       | No     | Yes     | Yes                | Yes                    | No              | Yes            | 5              |
| Jager et al. 2002 [37]     | Yes                | No                       | No     | Yes     | Yes                | Yes                    | No              | No             | 4              |

*Yes* indicates that this criterion was adequately reported in the paper

*The sample consisted of “midwives” and it is assumed that all would have been female given the cultural setting for this study
| Reference               | Country         | Reference Country | Had seen patients with FGMC | Managed women or girls with FGMC/FGMC complications; used prevention measures | Has performed FGMC or has been asked to perform FGMC | Clinical Guidelines/ Clinical Education to support practice |
|------------------------|-----------------|-------------------|-----------------------------|-------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------|
| Publications from African Countries |                 |                   |                             |                                                                               |                                                   |                                                         |
| Kaplan et al. 2013 [22] | Gambia          | 41 % - had seen a girl with complications of FGM/C | 41% - had seen a girl with complications of FGM/C | 8 % - had performed FGM/C                                                   |                                                  | NR                                                      |
| Ali et al. 2012 [23]    | Sudan           | NR                | NR                          | 81 % had performed FGM/C during their career                                 |                                                  | NR                                                      |
| Rasheed et al. 2011 [25] | Egypt           | NR                | NR                          | None of the nurses had performed FGM/C                                         |                                                  | NR                                                      |
| Refaat 2009 [26]        | Egypt           | NR                | NR                          | 19 % - performed FGM/C                                                       |                                                  | NR                                                      |
| Onuh et al. 2006 [28]   | Nigeria         | NR                | NR                          | 7 % - currently practice FGM/C                                               |                                                  | NR                                                      |
| Publications from "Western Countries" |                 |                   |                             |                                                                               |                                                   |                                                         |
| Caroppo et al. 2014 [29] | Italy           | 71 % - never met or assisted a woman with FGM/C despite working in an asylum seeker facility | 76 % - stated they would refer the woman for care elsewhere, with many different options provided | 34 % were aware of guidelines/procedures for the management of women with FGM/C |                                                  |                                                         |
| Purchase et al. 2013 [30] | UK              | 87 % - had been involved in the care of a girl/woman with FGM/C | 20 % - had seen >10 cases                                                   | 3 midwives had been asked to perform FGM/C in a child or to re-infibulate after delivery |                                                  | 26 % - had sufficient training in FGM/C                 |
| Relph et al. 2013 [31]  | UK              | 59 % had been involved in the care of a woman with FGM/C | NR                          |                                                                               |                                                  | NR                                                      |
| Moeed et al. 2012 [20]  | Australia and New Zealand | 76 % see women from African countries and from the Middle East | 47 % had seen at least one woman or girl with complications related to FGM/C - "most commonly" urinary problems; problems in labour and dyspareunia | 21 % - of O&G specialists asked to re-infibulate after birth |                                                  | NR                                                      |
| Study                  | Country | Year | Frequency | Problems associated with FGMC | Problems not discussed consistently | Consulted regarding complications | Other notes |
|-----------------------|---------|------|-----------|-------------------------------|------------------------------------|---------------------------------|-------------|
| Hess et al. 2010 [32] | USA     | 2010 | 43%       | Problems associated with FGMC | Problems not discussed consistently | Consulted regarding complications | 2% respondents had been asked to perform FGMC in Belgium |
| Kaplan-Marcus et al. 2009 [33] | Spain | 2009 | 6%        | Problems associated with FGMC | Problems not discussed consistently | Consulted regarding complications | 42% of paediatricians were aware of guidelines and protocols |
| Leye 2008 [34]       | Belgium | 2008 | 58%       | Problems associated with FGMC | Problems not discussed consistently | Consulted regarding complications | 51% wanted guidelines on FGMC |

For FGMC in clinical practice: 1% reported psychosexual complications.
Of the 109 abstracts screened, 67 did not study health professionals and 19 were reviews which did not include primary data. Twenty-three full text articles were reviewed in detail and 5 of these were excluded because they used qualitative methods, leaving 18 articles for analysis (Fig. 1) [20–37].

Of the 18 publications, eight originated from low-middle income countries in Africa, mainly from Nigeria and Egypt (Table 1). Ten came from high-income countries in Europe, one from Australia/New Zealand (ANZ), and one from the USA (Table 1). We found no studies that specifically focussed on paediatricians. Four studies reported on mixed samples, which included paediatricians, but only two of these analysed paediatricians as a separate subgroup (Table 1). Seventeen studies reported on health professionals’ knowledge, 13 on practice and 12 on attitudes, with only four studies reporting experience of FGMC in clinical practice (Table 3).

### Table 3: Reported experience of FGMC in clinical practice (Continued)

| Country          | Percentage in Practice | Percentage in Knowledge | Percentage in Attitudes | Notes |
|------------------|------------------------|-------------------------|-------------------------|-------|
| UK               | 20%                    | 80%                     | 65%                     | NR    |
| Sweden           | 60%                    | 39%                     | 10%                     | NR    |
| Switzerland      | 51%                    | 73%                     | 65%                     | NR    |
| Somalia, Ethiopia, Mali, Senegal | 40%   | 35%                     | 4%                      | NR    |
| Nigeria, Egypt, Mali, Senegal | 50%   | 45%                     | 3%                      | NR    |
| UK               | 20%                    | 35%                     | 10%                     | NR    |
| Sweden           | 35%                    | 4%                      | 3%                      | NR    |
| Switzerland      | 41%                    | 19%                     | 3%                      | NR    |
| Singapore        | 6%                      | 1%                      | 10%                     | NR    |
| Australia/New Zealand | 4%    | 2%                      | 5%                      | NR    |
| USA              | 65%                    | 20%                     | 10%                     | NR    |
| Nigeria, Egypt, Mali, Senegal | 50%   | 20%                     | 8%                      | NR    |

NR = Not reported; Sunna = Equivalent to the WHO Type 1 – cliteridectomy.
### Table 4: Health professionals’ reported knowledge about FGMC

| Reference                  | Country   | Knowledge of FGMC; FGMC types; high risk groups | Knowledge about complications                               | Knowledge about legislation / clinical guidelines |
|----------------------------|-----------|------------------------------------------------|------------------------------------------------------------|--------------------------------------------------|
| **Publications from African Countries** |           |                                                |                                                            |                                                  |
| Ashimi et al. 2014 [21]    | Nigeria   | 91 % - had heard of FGMC                       | 77 % - haemorrhage                                          | NR²                                              |
|                           |           | 40 % - did not know any of the 4 types          | 73 % - transmission of infectious disease (HIV, hepatitis and tetanus) |                                                  |
|                           |           | 49 % identified ‘Angurya and Gishiri’¹ as forms of FGMC | 63 % - sexual dysfunction                                  |                                                  |
| Kaplan et al. 2013 [22]    | Gambia    | NR                                             | 31 % - sexual dysfunction                                  | NR                                               |
| Ali et al. 2012 [23]       | Sudan     | 7 % - identified all 4 types correctly         | 46 % - transmission of infectious disease (HIV)             | 74.5 % - FGM/C is legal                         |
|                           |           | 54 % identified type 1 correctly               | 64 % - sexual dysfunction                                  |                                                  |
| Dike et al. 2012 [24]      | Nigeria   | NR                                             | 86 % - haemorrhage                                          | 100 % - FGM/C is banned in some states           |
|                           |           |                                                | 84 % - transmission of infectious disease (HIV)             |                                                  |
| Rasheed et al. 2011 [25]   | Egypt     | NR                                             | 66 % - knew about complications of FGM/C                    | NR                                               |
| Refaat 2009 [26]           | Egypt     | 76 % - know the type usually performed in Egypt (type II) | 75 % - haemorrhage                                          |                                                  |
|                           |           |                                                | 70 % - sexual dysfunction                                  |                                                  |
| Mostafa et al. 2006 [27]   | Egypt     | 52 % - correctly identified type I             | 62 % - aware that FGM can cause complications including:    | 17 % - knew Egyptian law which states that FGM cannot be performed by a non-physician |
|                           |           |                                                | 30 % - identified type II                                   |                                                  |
|                           |           | 5 % - identified type III                       | 48 % - short-term physical                                  | 28 % - reported that FGM/C violates the medical ethical principles of “do no harm” and “no not kill” |
|                           |           |                                                | 39 % - long term physical                                   |                                                  |
|                            |           |                                                | 62 % - psychosocial complications                           |                                                  |
|                            |           |                                                | 59 % - sexual dysfunction                                   |                                                  |
| Onuh et al. 2006 [28]      | Nigeria   | 100 % - identified at least one type of FGM/C  | 98 % - haemorrhage                                          | NR                                               |
|                           |           | 38 % - identified Type I and Type II ONLY as FGM/C | 81 % - transmission of infectious disease                    |                                                  |
|                           |           | 7 % - identified all 4 types correctly          | 54 % - transmission of HIV                                   |                                                  |
|                           |           |                                                | 80 % - difficult birth                                      |                                                  |
|                           |           |                                                | 55 % - scars and keloid formation                            |                                                  |
|                           |           |                                                | 21 % - infertility                                          |                                                  |
|                           |           |                                                | 59 % - sexual dysfunction                                   |                                                  |

¹ Angurya and Gishiri
² NR - Not reported
Table 4 Health professionals’ reported knowledge about FGMC (Continued)

| Publications from “Western Countries” | 9 % - knew that there are different types of FGMC depending on the woman’s country of origin | 5 % - knew how to manage a woman with FGMC | 44 % - knew that Italy has a law prohibiting FGMC practice |
|--------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------|
| Caroppo et al. 2014 [29] Italy       | 92 % - identified each of the long term complications                                    | 75 % - HIV/hepatitis risk                | 94 % - FGMC/C always illegal in the UK               |
|                                      | 74 % - pelvic infection                                                                  |                                         | 79 % - were aware of the FGMC Act                    |
|                                      | 10 % - associated psychiatric syndromes                                                |                                         | 84 % - knew to contact a child protection officer if they thought a child was at risk |
|                                      | To prevent complications during labour:                                                 |                                         |                                                     |
|                                      | 74 % - knew that defibulation should take place pre-conception                          |                                         |                                                     |
|                                      | 31 % - knew that defibulation is recommended at ~ 20 weeks pregnancy                    |                                         |                                                     |
|                                      | 52 % - unaware of referral pathways                                                    |                                         |                                                     |
| Purchase et al. 2013 [30] UK NR      | 100 % - aware of the practice of FGMC                                                  | 76 % - haemorrhage                       | 72 % - aware of UK legislation on FGMC/C            |
|                                      | 58 % - knew there are 4 types of FGMC/C                                                | 32 % - knew that defibulation should be performed before pregnancy to avoid complications | 89 % - family/religious figure performing FGMC/C in UK is illegal |
|                                      | 93 % of senior doctors                                                                  |                                         | 77 % - UK doctor performing FGMC/C in UK is illegal |
|                                      | 50 % of junior doctors                                                                 |                                         | 67 % - reinfibulation after delivery is illegal     |
|                                      | 40 % - confident in diagnosing FGMC/C                                                  |                                         | 78 % - sending a child abroad for FGMC/C is illegal |
| Relph et al. 2013 [31] UK 100 %      | 18 % - knew that both Muslim and Christian women may have FGMC/C                        | 71 % - of nurse midwives who did not have direct experience with FGMC knew about FGMC complications , compared with 89 % of those who had direct experience | 56 % - knew that it is illegal to perform FGMC/C in girls and young women aged <18 years |
|                                      | 39 % - knew FGMC/C is NOT required by either religion                                   |                                         |                                                     |
|                                      | Nurse midwives with direct practice experience of FGMC/C scored better on a knowledge test |                                         |                                                     |
| Hess et al. 2010 [32] USA 18 %       | 97 % knew what FGMC/C is                                                                | NR                                      | 20 % - aware of protocols or guidelines             |
| Kaplan-Marcusan et al. 2009 [33]     | Able to identify the 4 types:                                                          |                                         | 42 % - of paediatricians aware of protocols or guidelines |
|                                      | 41 % - of all professionals                                                            |                                         |                                                     |
|                                      | 68 % - of O&G                                                                           |                                         |                                                     |
|                                      | 55 % - of paediatricians                                                                |                                         |                                                     |
|                                      | 38 % - general medicine                                                                 |                                         |                                                     |
|                                      | 79 % - said they knew high risk countries                                               |                                         |                                                     |
|                                      | 22 % - actually able to identify the high risk countries                                 |                                         |                                                     |
| Leye 2008 [34] Belgium NR NR         | 46 % - knew that FGMC/C was illegal in Belgium                                           |                                         |                                                     |
from high income countries reporting on health professionals’ attitudes (Table 1).

Quality assessment
Publications were scored according to our pre-determined quality assessment matrix (Table 2). Only one publication scored the maximum eight points. Twelve (67 %) papers described the age of the participants and 11(61 %) reported gender. A description of the setting was lacking in two studies, sampling procedures were not described in three. (Table 2). Six (33 %) of the surveys were pre-tested, five (22 %) were reviewed by content experts, and two (11 %) were both pre-tested and reviewed by a content expert. Nine studies did not report any survey validation. Most of the studies are unlikely to be representative. Three studies from high income countries were set in specialist facilities serving migrant communities in which FGM/C is common and the health professionals surveyed had frequent experience with women affected by FGM/C.[29, 31, 35] Two studies did not report a response rate and in 5 studies the response rate was <50 %, (Table 1).

Table 4 Health professionals’ reported knowledge about FGMC (Continued)

| Study            | Country | Knowledge about FGMC | Knowledge about Complications | Knowledge of the UK FGMC Act | Knowledge of Different Types | Knowledge of Best Time for Defibulation | Knowledge of High Risk Groups | Knowledge of Anterior Episiotomy | Knowledge of Risk Identification |
|------------------|---------|----------------------|-------------------------------|-------------------------------|-----------------------------|----------------------------------------|--------------------------------|-------------------------------|---------------------------------|
| Zaidi et al. 2007 [35] UK | 98 % - knew what FGM/C was | 84 % - knew of complications associated with FGM/C | 70 % - knew that the best time for defibulation was before pregnancy (if FGM/C diagnosed before pregnancy) | 80 % - knew that defibulation should be done during pregnancy if diagnosed during pregnancy | 54 % - knew that an anterior episiotomy should be performed if the woman is in the 2nd stage of labour | 40 % - knew the details of the UK FGM/C Act |
| Tamaddon et al. 2006 [36] Sweden | 28 % - said they had adequate knowledge about FGM/C | NR | NR | NR | NR | NR |
| Jager et al. 2002 [37] Switzerland | NR | NR | NR | NR | NR | NR |

*NR = Not reported

"Angurya" is a form of FGMC type 4 that involves the scraping of tissue around the vaginal opening. "Gishiri" is a form of FGMC type 4 where a long knife is inserted into the vagina and backward cuts from the vagina’s anterior wall into the perineum are made.

1. Do health professionals have experience with FGM/C in their clinical practice?

Five surveys in high income countries reported that health professionals who responded provided care to women with FGM/C, including 75.3 % of obstetricians/gynaecologists in ANZ [20]; 40 % of nurse-midwives in the USA [32]; 50 % of Swiss obstetricians/gynaecologists [37]; 60 % of Swedish health providers including paediatricians [36]; 12 % of paediatricians, 80 % of gynaecologists responding to a Spanish survey [33]; and 58 % of Belgian gynaecologists [34], (Table 3). Despite working in an asylum seeker health service in Italy, which serves refugees from high prevalence countries, 71 % of health professionals reported that they had never met or assisted a woman with FGM/C [29].

Some obstetricians, gynaecologists and midwives working in high income countries had been asked to re-infibulate women after delivery and some had done so (Table 4). Four studies reported that health professionals in high income countries had been asked to perform FGM/C in babies or young girls, or to
| Reference               | Country   | Beliefs about the reasons for performing FGM/C | Support for and intentions for performing FGM/C | Beliefs and attitudes about the law and educational needs |
|------------------------|-----------|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------|
| Publications from African Countries |           |                                               |                                               |                                                  |
| Ashimi et al. 2014 [21] | Nigeria  | 53 % - prevent promiscuity                     | 4 % would support FGM/C                       | NR                                               |
|                        |           | 28 % - preserve virginity                      | 4 % would perform FGM/C                       |                                                  |
|                        |           | 16 % - socio-cultural acceptance                | 4 % of respondents (all women) would allow daughters to undergo FGM/C |                                                  |
|                        |           | 10 % - religious reasons                        |                                               |                                                  |
|                        |           | 8 % - medically beneficial                      |                                               |                                                  |
| Kaplan et al. 2013 [22]| Gambia   | 54 % - mandatory religious practice             | 43 % - were supportive of the continuation of FGM/C practice | NR                                               |
|                        |           | 48 % - cultural practice                        | 47 % - intended to subject their daughters to FGM/C |                                                  |
|                        |           | 14 % - preserve virginity                       | 43 % - medicalising FGM/C would make the practice safer |                                                  |
|                        |           | 1 % - it does not violate human rights           | 73 % - Health care workers have a role in eliminating FGM/C |                                                  |
|                        |           |                                               | 55 % – FGM/C cannot be eliminated in The Gambia |                                                  |
|                        |           |                                               | 78 % - men should be involved in the debate about FGM/C |                                                  |
|                        |           |                                               | 13 % - girls that have not undergone FGM/C should be discriminated against |                                                  |
| Ali et al. 2012 [23]   | Sudan    | 51.2 % - cultural                               | 19 % - all forms of FGM/C are harmful         | NR                                               |
|                        |           | 26 % - religious                                | 76 % - only some forms are harmful            |                                                  |
|                        |           | 23 % - economic                                 | 5 % - all forms are not harmful               |                                                  |
| Dike et al. 2012 [24]  | Nigeria  | 51 % - prevent promiscuity                      | 100 % would NOT have their daughters undergo FGM/C | To stop FGM/C:                                   |
|                        |           | 47 % - appearance of external genitalia         |                                               | 81 % - Public enlightenment needed                |
|                        |           | 27 % - tradition                                |                                               | 25 % - Counselling of parents                     |
|                        |           | 11 % - initiation into womanhood                |                                               | 7 % - punishing any person who aids or abets the practice |
|                        |           | 7 % - spiritual satisfaction                    |                                               |                                                  |
| Rasheed et al. 2011 [25]| Egypt   | 100 % - senior physicians believed FGM/C prescribed by religion | Nurses:                                      | NR                                               |
|                        |           | 97 % - young physicians believed FGM/C prescribed by religion | 88 % - supported the practice of FGM/C         |                                                  |
|                        |           | 88 % - nurses believe it is a traditional practice | 48 % - would have their daughters undergo FGM/C |                                                  |
|                        |           |                                               | 28 % - had their daughters undergo FGM/C      |                                                  |
|                        |           |                                               | Young Physicians:                            |                                                  |
|                        |           |                                               | 34 % - supported the practice of FGM/C        |                                                  |
|                        |           |                                               | Senior physicians:                          |                                                  |
|                        |           |                                               | 15 % - supported the practice                |                                                  |
| Refaat 2009 [26]       | Egypt    | 82 % - do NOT approve of the practice           | 18 % - supported practice; reasons for continuing practice included: | 91 % - FGM/C and complications should be taught at medical school |
|                        |           |                                               | • Convinced of benefit                       |                                                  |
|                        |           | Those practising in the Upper Egypt area, those from rural areas and those | 40 % believed that physicians are the most |                                                  |
Table 5: Health professionals’ attitudes towards FGMC (Continued)

| Health professionals’ attitudes | FGMC attitudes | Publications from "Western Countries" |
|---------------------------------|----------------|---------------------------------------|
| with a diploma (rather than PhD or Fellowship) were more likely to approve the practice of FGMC | • Profit | 35 % did NOT approve of the law banning FGMC |
| • Harm reduction | 82 % - did NOT approve of the practice for the following reasons: |  |
| 18 % - supported practice for religious or customary reasons | 75 % - reduced sexual pleasure |  |
| 75 % - pain | 64 % - bad habit |  |
| 52 % - not religious practice | 49 % - causes health problems |  |
| 49 % - causes health problems | 48 % - against women’s dignity |  |
| Mostafa et al. 2006 [27] Egypt | 51 % - NO medical reason for performing FGMC | 50 % - medicalization is the first step to prevention of the practice |
| 43 % - unethical for a health professional to damage a healthy body | 23 % - believed that the law is enough for prevention |
| 65 % - FGMC is NOT a health issue | 53 % - believe that laws must go hand in hand with community education |
| 45 % - FGMC is a violation of human rights | 32 % - would subject their future daughters to this practice |
| 34 % - FGMC is essential part of culture | 58 % - would NOT object if family members were to subject their daughters to FGMC |
| 24 % - FGMC prevents external genitalia from growing | 73 % - FGMC should be medicalised |
| 20 % FGMC ensures a girl’s virginity | 91 % - medicalization favourable because it reduces pain; carried out under hygienic conditions and with anaesthetic |
| 49 % - prevents promiscuity |  |
| 30 % - FGMC is a religious obligation |  |
| 86 % - believed that FGMC is practiced only by Muslims |  |
| Onuh et al. 2006 [28] Nigeria | 9 % - decreases promiscuity | 92 % - FGMC should be legislated against |
| 4 % - will have their own daughters undergo FGMC |  |
| 10 % - makes genitalia more attractive | 3 % - FGMC is a good practice |
| Other reasons: -- cultural; financial; patient safeguarding from “traditional circumcisers” | 3 % - will encourage FGMC |
| 24 % - some forms of FGMC are not harmful |  |
| Purchase et al. 2013 [30] UK | 76 % - cultural reasons | NR |
| 16 % - religious reasons | NR |  |
| Relph et al. 2013 [31] UK | 100 % - cultural reasons | 9 % - FGMC should be medicalized to reduce complications |
| | 9 % - FGMC should be medicalized to reduce complications | 87 % - would warn social services of a child in danger of FGMC |
| | 18 % - would support a woman’s request for re-infibulation after birth if this was legal in the UK |  |
| Moeed et al. 2012 [20] Australia and New Zealand | NR | 21 % - O&G specialists believed that in the women and girls with FGMC seen by them, the FGMC was probably done in Australia (but they did not provide number estimates) |
| | NR | 42 % of the FGMC workers believed that the women and children with FGMC probably had the procedure performed in Australia/NZ |
provide information about where to get FGM/C procedures done: two respondents to the ANZ survey [20]; 6 respondents to the Belgian study [34]; two respondents to the Swiss survey [37] and seven health professionals including two paediatricians in a Swedish survey [36] (Table 3).

Survey respondents in high income countries reported that they knew that FGM/C was being practised in children including in Belgium and Switzerland [34, 37]. Approximately 20 % of obstetricians/gynaecologists responding to the ANZ survey believed that women presenting to them with FGM/C probably had the procedure done in Australia or New Zealand [20].

Five surveys of health professionals in Nigeria [28], Egypt [25, 26], Gambia [22] and the Sudan [23] reported on whether the respondents had performed or had been asked to perform FGM/C procedures (Table 3). The study of Sudanese midwives reported that 81 % of respondents had performed FGM/C multiple times [23]. In contrast, among nurses and community midwives surveyed in Gambia, only 7.6 % had performed the procedure but 68.6 % said that FGM/C was practiced in their household or family [22]. Among nurses surveyed in Nigeria, 7 % currently practiced FGM, 14 % had practiced in the past and 58 % said they would perform FGM/C if required [24]. None of the nurses surveyed in Egypt [25] had performed FGM/C, but 19.2 % of Egyptian doctors surveyed had performed FGM/C and of these 24 % reported complications due to FGM/C [26].

2. Do health professionals have adequate knowledge about FGM/C types, complications, high risk groups and do they have access to education and training opportunities?

Table 5 Health professionals’ attitudes towards FGMC (Continued)

| Kaplan-Marcus 2009 [33] | Spain | 50 % - traditional reasons | NR | 2001 - 1 % said ignore the problem |
|-------------------------|-------|-----------------------------|-----|---------------------------------|
|                         |       | 16 % - religious reasons    |     | 48 % - educate                  |
|                         |       |                             |     | 32 % - educate and report       |
|                         |       |                             |     | 19 % - report to authorities    |
|                         |       |                             |     | 2004 – None said ignore         |
|                         |       |                             |     | 49 % - educate and report       |
|                         |       |                             |     | 27 % - educate                  |
|                         |       |                             |     | 24 % - report to authorities    |
| Leye 2008 [34]          | Belgium | NR                          | 86 % - FGM/C is a form of violence against women |
|                         |       |                             | 61 % - FGM/C is a violation of human rights |
|                         |       |                             | 7 % - FGM/C should be respected because of cultural and religious beliefs |
|                         |       |                             | 77 % - considered re-infubulation as a form of FGM/C |
|                         |       |                             | 19 % - would re-infibulate if requested by the woman |
|                         |       |                             | 47 % - a symbolic incision was a good alternative to FGM/C |
|                         |       |                             | 15 % - Genital piercings and vaginal cosmetic surgery considered a type of FGM/C |

NR = Not reported
Knowledge about the FGM/C types varied widely; few health professionals in high income countries knew that there were 4 different types of FGM/C and fewer were able to identify the 4 types (Table 4). The Spanish study was an exception with 85 % of O&G and 55 % of paediatricians able to identify the 4 types of FGM/C [33]. Knowledge of the 4 types of FGM/C was also poor among respondents surveyed in Africa, however, most respondents knew of the type of FGM most commonly practiced in their local area e.g. 76 % of Egyptian health professionals knew of type II FGM/C which is usually performed in Egypt [26].

In a study in North East London, 50 % of senior doctors and only 7 % of junior doctors had formal training in FGM/C; midwives were more confident in diagnosing FGM/C than doctors and 75 % of medical students were aware of FGM/C complications [31]. However, in an earlier study of midwives and doctors who attend births, also in London, only 4 % could correctly identify the different types of FGM/C and knowledge about the correct procedures to de-infibulate women during labour was poor for ~45 % of the respondents [35].

Survey respondents correctly identified a number of short and long-term complications of FGM/C although some studies reported that respondents knew of no complications after FGM/C (Table 4). Almost all participants (92 %) in the study in Birmingham, UK, correctly identified most long-term complications of FGM/C except for HIV/hepatitis and pelvic infection [30]. Only two studies asked about knowledge of psychological or psychosocial complications after FGM/C [30, 31].

Eleven per cent of Belgian doctors aged less than 40 years had been taught about FGM/C but only 1 % knew of guidelines or information about FGM/C in their hospital [34]. Education on FGM/C is not regularly included in undergraduate education in Switzerland [37]. Few Swedish paediatricians knew about FGM/C and the motives behind FGM/C [36], and Norwegian health professionals felt that they had inadequate knowledge and skills about FGM/C and they called for specific training in how to speak with women and families about FGM/C and which words to use when raising the issue (Table 4).

In a survey of obstetricians and other health professionals working in a large UK clinic, 26 % believed they had adequate training in FGM/C, 41 % had been trained in de-infibulation, 31 % knew that the hospital regularly screened for FGM/C and that the hospital had an obstetrician and a midwife that specialised in FGM/C [30]. Among paediatricians surveyed in Spain, 42.3 % were aware of protocols and guidelines about FGM/C [33]. In the study from Belgium, 51 % of gynaecologists surveyed, wanted relevant guidelines on FGM/C, 35 % said they tried to prevent mothers who had FGM/C from allowing FGM/C to be performed in their female children, but 65 % said they would not do any prevention [34].

3. Do health professionals have adequate knowledge about laws related to FGM/C?

In a recent study of members (N = 607) of the Royal College of Obstetricians and Gynaecologists in the UK, 94 % understood that FGM/C is always illegal in the UK but 21 % were unaware of the FGM/C Act, (Table 4) [30]. The majority (84 %) of respondents said they would speak with a child protection officer if they suspected a child was at risk of FGM/C [30]. In the London study by Zaidi et al. 40 % of health professionals were familiar with the FGM/C Act [35]. Relph et al. reported that only 60 % of the UK health professionals surveyed were aware of current UK FGM/C law [31]. In the Belgian survey of gynaecologists, 45.5 % knew that FGM/C was illegal in Belgium, the majority (85.6 %) understood that FGM/C constituted violence against women, but only 60 % felt that it violated human rights [34]. Over a half (56 %) of midwives surveyed in a USA study knew that FGM/C was against the law [32]. In the Italian study of health professionals working with asylum seekers from FGM/C prevalent countries, less than half knew about the law prohibiting FGM/C in Italy [29].

Only 25 % of the Sudanese respondents [23] and 17 % of Egyptian respondents [24] knew that FGM/C was illegal in their country (Table 4). Furthermore, 35 % of Egyptian doctors responding to survey conducted by Refaat et al. did not approve of the law banning FGM/C [26]. However, all participants surveyed in a Nigerian study knew that FGM/C was illegal in some states [24].

4. What are the attitudes and beliefs of health professionals towards the practice of FGM/C?

Beliefs about the reasons for performing FGM/C varied widely with some respondents from both high income countries and from African countries believing that FGM/C was done for religious reasons (Table 5). Surveys from African countries also cited other reasons including cultural, social, medical economic and cosmetic, included “preservation of virginity”, “curbing promiscuity”, and “improving the appearance of genitalia,” while those from high income countries only cited cultural/traditional reasons or religious reasons (Table 5). In four surveys, between 4 % and 48 % of health professionals indicated that they would agree for their own daughters to undergo FGM/C [21, 25, 27, 28].

A minority of health professionals practising in high income countries were not against FGM/C. Seven of 344 Belgian doctors felt that FGM/C deserved respect
because of cultural and religious connotations [34]. A survey of labour ward health personnel in the UK, showed that 14% believed that a competent adult should be allowed to consent to FGM/C, 9% felt that the procedure could be "medicalized" to prevent complications, and 17% said they would support a woman's request for re-infibulation [31]. Health professionals from high income countries indicated that they would reluctantly support re-infibulation of women from countries where this is customary to protect the woman from being marginalised from her community [26, 31]. In the ANZ study most respondents believed that it is acceptable to oversee labia majora to prevent infection and fusion, and for patient comfort [20]. Between 15% and 91% of Egyptian health professionals surveyed, supported FGM/C if performed by a doctor to minimise harm (Table 5) [25–27].

Health professionals believed that laws will only be effective with the implementation of better awareness and education for patients and the community about FGM/C [24, 33].

Discussion
Our review confirms that the practice of FGM/C continues and remains prevalent in some African countries despite many having adopted laws against this practice. We found 10 studies confirming that health professionals working in high income countries such as Australia, New Zealand, United Kingdom, Italy, Sweden, Belgium, Spain and Switzerland care for women and girls with FGM/C [4–7, 10–12, 21–23]. Some have been approached to perform FGM/C in babies or young children [20, 24, 34, 37]. Furthermore, health professionals in Australia and New Zealand, the UK, Belgium and Switzerland believed that it was likely that some of their patients with FGM/C had the procedure done in these high income countries despite legislation making FGM/C illegal. Some health professionals did not know about anti-FGM/C laws or were unsure what these laws covered and what their obligations were under the laws [11]. There have been few prosecutions for FGM/C in countries where such laws exist [38]. Laws are not a deterrent if communities perceive that the risk of detection is low and there are few prosecutions [4, 5, 38]. To prevent the practice of FGM/C, health professionals felt that laws were not enough and needed to go hand in hand with awareness campaigns and education for patients and communities, including the men in those communities [24]. This is supported by the recently published UK Multi-Agency Practice Guidelines on Female Genital Mutilation [5].

Our systematic review is limited by the quality of the published studies, many with small sample sizes and low response rates. Although attitudes to FGM/C may differ according to the gender of the health professionals surveyed, this could not be assessed in our review due to inadequate sample description, seven of the 18 studies failing to report the gender of respondents.

The level of knowledge about FGM/C among health professionals varied with most unable to recognise the 4 different types of FGM/C described by the WHO. Few were able to identify countries where FGM/C is prevalent and therefore did not know that women from these countries are at high risk of FGM/C. Health professionals who regularly worked with women from high risk communities and where the health service was targeted to these communities had better knowledge of FGM/C. However, even in a clinic in the UK that sees many women with FGM/C, only 26% felt that they had adequate training about FGM/C [23].

Only two studies included in our review reported on psychological and psychosocial problems, either immediate or long-term, which are associated with FGM/C [27, 30]. This is consistent with findings from a study by Mulongo et al. and supports the need to raise awareness in health professionals about these under-recognised consequence of FGM/C and the need to provide counselling services to support women and girls affected by FGM/C and their families [8].

Most of the studies surveyed obstetricians, gynaecologists, nurses, midwives and other health professionals working with pregnant women. Only two surveys reported separate data for paediatricians [6, 7]. Paediatricians have an important role in recognising children at risk, preventing FGM/C by counselling parents and communities, reporting children to authorities, and in treating children who have undergone FGM/C and are suffering complications [5, 6, 19]. Of the 18 studies included in this review, only 5 addressed prevention of FGM/C, mainly through counselling women who have FGM/C and have recently given birth, against FGM/C for their daughters [4–6, 10, 11]. This is appropriate as the strongest predictor of a child undergoing FGM/C is the mother having undergone FGM/C herself [5]. However, in a study of Belgian obstetricians and gynaecologists 65% said they would not undertake to counsel women to prevent FGM/C among their daughters [10]. This may be because they feel inadequately trained and resourced to advocate against FGM/C. In a large survey of Belgian midwives, which was not included in our systematic review as it was only recently published on-line, the majority lacked adequate access to education and guidelines about FGM/C to provide adequate care, and to counsel mothers against FGM/C for their new born daughters [39].

Health professionals need education and guidelines relevant to FGM/C provided both in basic medical training and in continuing medical education. They wanted
more information about how to speak with families about this culturally sensitive issue, how to recognise children who might be at risk of FGM/C and how to treat women and girls who have undergone FGM/C. The RACP guidelines on FGM/C provide a short summary of recommendations for paediatricians who may be faced with FGM/C, however, there is no practical guidance of what to do and what to say when dealing with a child with FGM/C or at risk of FGM/C and her family, often within a complex medical and socio-cultural context [40]. Health professionals also called for better education about anti-FGM laws and their obligations under these laws.

As FGM/C often occurs in the community, there is a need for community health workers, general practitioners, community nurses and community paediatricians to be educated about FGM/C and to be provided with clear guidelines about what actions they need to take to prevent FGM/C, including guidance about when and how to report children to child protection authorities. Health professionals must also be provided with appropriate structures within the healthcare system, including referral pathways and specialist services for women and girls with FGM/C, and girls who may be at risk of FGM/C. Such pathways, integrating community prevention with inter-agency, inter-sectoral collaboration including schools, health services and community groups, has been recommended and is being implemented in the UK [5, 19]. Furthermore, healthcare systems, practitioner credentialing bodies and communities have an important role in education and prevention of the medicalization of FGM/C [41].

Conclusion
This is the first literature review of health professionals’ knowledge, attitudes and practice related to FGM/C. Only 18 studies were identified between the years 2000 and 2014, suggesting that this topic is under-researched. The review highlighted the need for easily accessible educational resources and evidence-based guidelines to enable health professionals to provide culturally sensitive and psychological care for women and girls who have undergone FGM/C. Furthermore, health professionals, especially paediatricians and family doctors, need skills to recognise women and girls at risk of FGM/C; they need resources to enable them to counsel girls and their families and communities to prevent this harmful and illegal practice. Most of the research papers reported on obstetricians, gynaecologists and other health professionals dealing with pregnant women. As the immigrant communities in high income countries become larger and increasingly multicultural and ethnically diverse, health professionals are more likely to see women and girls with FGM/C or at risk of FGM/C, in their clinical practice. Further research is needed to determine knowledge gaps and needs for education and resources among other groups of clinicians including paediatricians, general practitioners and community health workers.

Abbreviations
FGM/C: Female genital mutilation or cutting; PRISMA: Preferred reporting items for systematic reviews and meta-analyses.

Competing interests
The authors have no competing interests.

Authors’ contributions
YZ and EE initiated the study, wrote the funding application, set the aims and methodology, including the search strategy. YZ screened the search publications, analysed and interpreted the data, and drafted the manuscript. PS assisted with search strategy development, conducted the search, screened the abstracts and assisted with data extraction. AP screened the search publications, extracted the data and assisted in writing the results. All authors revised the manuscript, provided comments and agreed with the final submitted version. All authors read and approved the final manuscript.

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