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Does Female Genital Mutilation/Cutting (FGM/C) Affect Women's Sexual Functioning? A Systematic Review of the Sexual Consequences of FGM/C

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Abstract Female genital mutilation/cutting (FGM/C) refers to a cultural practice which involves partial removal of or injury to the female external genitalia for cultural or other non-therapeutic reasons. Estimates suggest that there are 100–130 million girls and women currently living with various health consequences from FGM/C. We aimed to conduct a systematic review and meta-analysis of the sexual consequences of FGM/C. A total of 15 studies, of variable methodological quality, with 12,671 participants from seven different countries were included. The majority of the 65 outcomes were statistically associated with FGM/C status at study level. Meta-analysis results showed that compared to women without FGM/C, women who had been subjected to FGM/C were more likely to report dyspareunia (relative risk (RR)=1.52, 95% confidence interval (CI)=1.15, 2.0), no sexual desire (RR=2.15, 95% CI=1.37, 3.36) and less sexual satisfaction (standardized mean difference=−0.34, 95% CI=−0.56, −0.13). Heterogeneity precluded additional consideration of other outcomes. The systematic review substantiates the proposition that a woman whose genital tissues have been partly removed is more likely to experience increased pain and reduction in sexual satisfaction and desire. Increased research efforts to investigate the sexual harms from FGM/C are indicated. Sexual education and therapy could be offered to women with FGM/C who want that.

Keywords Female genital mutilation/cutting · Consequences · Sexual functioning · Systematic review

Introduction

Female genital mutilation/cutting (FGM/C)[1] is a traditional practice that involves 'the partial or total removal of the female external genitalia or other injury to the female genital organs for cultural or other non-therapeutic reasons' (WHO 1997). While recognizing that there is a wide range of variation to clarify understanding of the prevalence and consequences of FGM/C, WHO has classified the procedure into four categories: Type I, clitoridectomy, involves partial or total removal of the clitoris and/or the prepuce. Type II, excision, involves partial or total removal of the clitoris and the labia minora, with or without excision of the labia majora. Type III, infibulation, involves narrowing of the vaginal orifice with creation of a covering seal by cutting and appositioning the labia minora and/or the labia majora, with or without excision of the clitoris. Infibulation is considered the most invasive type of FGM/C. Type IV, other, involves all other harmful procedures to the female genitalia for non-medical purposes, for example, pricking, piercing, incising, scraping and cauterizing (WHO 2008). In type IV, no genital tissue is excised.

Although FGM/C transcends geography, it is primarily practised among various ethnic groups in more than 28 countries in Africa, usually on girls under the age of 15 years (UNICEF 2005; WHO 2006). Recent national figures for African countries show a prevalence of FGM/C of more than 70% in countries like Burkina Faso, Egypt, Ethiopia, Mali and Somalia (Yoder and Kahn 2008).

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[1] The terminology used for the cutting of external female genital tissues varies. It has been referred to as 'female circumcision', 'female genital mutilation', 'female genital cutting' and 'female genital mutilation/cutting' (WHO 2008). We adopt the official terminology used by UNICEF and UNFPA "female genital mutilation/cutting" in this article.

However, there is great variation in prevalence between and within countries, reflecting ethnicity and tradition (UNICEF 2005). The practice is found in some countries in the Middle East and Asia (UNICEF 2005; WHO 2006), for example, among some Bedouin tribes in the western part of Saudi Arabia (IRIN 2005). Although limited data exist, it is speculated that FGM/C is practised also by immigrant communities in a number of Western countries, including Australia, Canada, France, Norway, Sweden, the UK and the USA (WHO 2006).

As governments have become more aware of FGM/C, there has been an increasing amount of initiatives geared towards the eradication of the practice among practising communities. In Western countries, legislation has been instituted as the main intervention tool (European Parliament 2004; Leye et al. 2007; UNICEF 2005; WHO 2006). Efforts to abandon the practice of FGM/C in Africa have used several different approaches, including those based on legal mechanisms, human rights frameworks, health risks, alternative rites and comprehensive social development approaches (Muteshi and Sass 2005). Recently, a systematic review assessed the effectiveness of interventions (Denison et al. 2009), but because of the paucity of high-quality evidence, few firm conclusions could be drawn regarding changes in knowledge, attitudes and behaviours related to FGM/C.

All forms of FGM/C cause permanent, irreparable changes in the external female genitalia. According to WHO data (2008), girls exposed to FGM/C are at risk of immediate physical consequences such as severe pain, bleeding, shock, difficulty in passing urine and faeces and infections. Long-term consequences can include chronic pain and infections. In general, the consequences are similar for FGM/C types I, II and III, but they tend to be more severe and more prevalent the more extensive the procedure (WHO 2008). Further, for many girls and women, undergoing FGM/C is a traumatic experience that may leave a lasting psychological mark and adversely affect their mental health (see, e.g. Al-Krenawi and Wiesel-Lev 1999; Behrendt and Moritz 2005; Toubia 1994; Vloeberghs et al. 2010).

In the mid-1990s, Toubia (1994) concluded that little scientific research was available on the sexual consequences of FGM/C, and Obermeyer's review a few years later (1999) confirmed that only a handful of studies existed. Until now, the researcher's updated review of the consequences of FGM/C for health and sexuality (Obermeyer 2005) may have represented the best available evidence regarding the sexual sequelae of FGM/C. Obermeyer concluded that the available evidence did not support the hypotheses that FGM/C destroys sexual functioning or precludes enjoyment of sexual relations. We aimed to update the literature and conduct a systematic review of empirical work assessing sexual consequences of FGM/C. We reviewed also the psychological and social consequences of FGM/C, but those results, as well as further details on the sexual consequences, are presented elsewhere (Berg et al. 2010).

Methods

We conducted a systematic review of the sexual consequences of FGM/C in accordance with guidelines in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins and Green 2008).

Literature Search

We searched systematically for relevant literature in 13 international databases (African Index Medicus, Anthropology Plus, British Nursing Index and Archive, The Cochrane Library (CENTRAL, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects), EMBASE, EPOC, MEDLINE, PILOTS, POPLINE, PsycINFO, Social Services Abstracts, Sociological Abstracts, WHOLIS) up to March 2011, using a strategy incorporating subject headings (e.g. MeSH terms in MEDLINE) and text words, in title and abstract, relating to FGM/C and the four classifications thereof, such as mutilation, circumcision and excision. No method filters were applied as we prioritized sensitivity over specificity. We supplemented with searches in databases of six international organizations that are engaged in projects regarding FGM/C, searches in reference lists of relevant reviews and included studies and personal communication with experts involved in FGM/C-related work. The complete search strategy is available elsewhere (Berg et al. 2010).

Selection of Studies

Studies were eligible for inclusion when 'exposed' (women with FGM/C, classified as types I–IV according to the WHO modified typology (WHO 2008)) and 'unexposed' (women without FGM/C) groups were compared and the risk among those exposed compared to those unexposed were assessed. We enforced no limitations on age, race/ethnicity, nationality or other participant characteristics, but the women needed to be part of a community in which FGM/C was a customary practice. Outcomes were the range of behavioural and experiential sexual consequences and could include, but were not limited to, sexual satisfaction, libido, and dyspareunia (pain during intercourse). We accepted several study designs (systematic reviews, cohort studies, case–control studies, cross-sectional studies), and unpublished reports, abstracts, brief and preliminary reports were considered for inclusion on the same basis as published reports. We included all publication years and languages.

When considered likely to meet the inclusion criteria, studies were translated to English.

Screening of literature was carried out in a two-stage procedure whereby each level consisted of increasing scrutiny of the studies based on the inclusion criteria of the systematic review. The authors (RB and ED) independently assessed first all titles/abstracts and then the full texts of the potentially relevant studies. At each level, the authors compared their judgements and excluded studies that did not meet all inclusion criteria. Pre-designed inclusion forms were used for each screening level. The reviewers were not blinded to the authors or other information about the publication when assessing the studies.

Data Extraction and Analysis

The authors independently extracted data from the published sources using a pre-designed data recording form. Differences in opinion in either the screening or data extraction processes were few and were resolved through re-examination of the publication and consensus. Assessment of the risk of bias of included studies was done with a combination version of the Norwegian Knowledge Centre for the Health Services' quality assessment tools for cross-sectional studies and cohort studies (the 12-question checklist is available in Berg et al. 2010). We agreed upon a final decision of high, moderate or low methodological quality for each study after discussing whether there was a discrepancy between the two reviewers with respect to the questions.

We applied the instrument Grading of Recommendations Assessment, Development and Evaluation (GRADE) with GRADE-Profiler version 3.2.2 to assess the extent to which we could have confidence in the effect estimates (Higgins and Green 2008). In addition to type of study, the criteria were methodological quality of study, consistency, directness, precision and publication bias. We used the four standard definitions in grading the quality of the evidence (high, moderate, low, very low). For more details about the GRADE system, we refer to publications by the GRADE Working Group (Guyatt et al. 2008). We extracted and grouped dichotomous and continuous data for all outcomes meeting the inclusion criteria.

We grouped the descriptive data according to outcomes across the studies and presented data for women with FGM/C and without FGM/C separately in the result tables to allow for comparison. We estimated effect for dichotomous variables by the relative risk (RR) and 95% confidence interval (95% CI) and effect for continuous variables by mean difference (mean diff) and 95% CI. We also decided, a priori, if studies were sufficiently similar, to pool those that could be grouped together and use the statistical technique of meta-analysis to estimate effect. To be pooled, the same outcome had to be assessed in a similar manner in similar populations across studies. As is standard, we used Mantel–Haenszel random effects meta-analyses for dichotomous outcomes and inverse-variance random effects meta-analyses for continuous outcomes. Given that under the fixed effects model it is assumed that all studies in the meta-analysis are replications of each other, we deemed it appropriate to use the random effects model. In this model, the more relaxed assumption is made that the included studies can be seen as a sample drawn from a population of studies, and each primary study is allowed to introduce its own amount of heterogeneity into the meta-analysis. This is reflected in the broader 95% CIs usually observed under the random effects model and its more conservative test results. We also examined between-study heterogeneity, with the chi-square (chi^2) and *I*-square (I^2) tests. A high value shows that most of the variability across studies is due to heterogeneity rather than to chance. We used RevMan 5, Cochrane Collaboration's meta-analysis software (Higgins and Green 2008).

Results

Description of Included Literature

The search resulted in 7,515 individual records (Fig. 1). Of 38 potentially relevant records, two could not be obtained in full text (Abd El-Hady and El-Nashar 1998; Omara 1994); thus, we read the full text for 36 publications, of which 15 studies met the inclusion criteria.

Study Characteristics

All of the 15 included studies were published in peer-reviewed journals, and with the exception of Shandall's 1967 study, most can be considered relatively new publications, the great majority being published within the last decade (Table 1). We assessed the studies' methodological quality. Two studies were judged to be of high methodological quality, three were of moderate quality and the remaining ten studies were judged to be of low methodological quality. It was a strength that in all studies, except one where it was unclear (Badawi 1989), the authors explained that the non-exposed group was selected from the same population as the exposed group and that many described that the groups were comparable with respect to important background factors. However, most studies failed to explain whether and how the participants who agreed to participate were different from those who refused to participate, that the measures used were reliable and valid and whether the person who assessed the outcome was

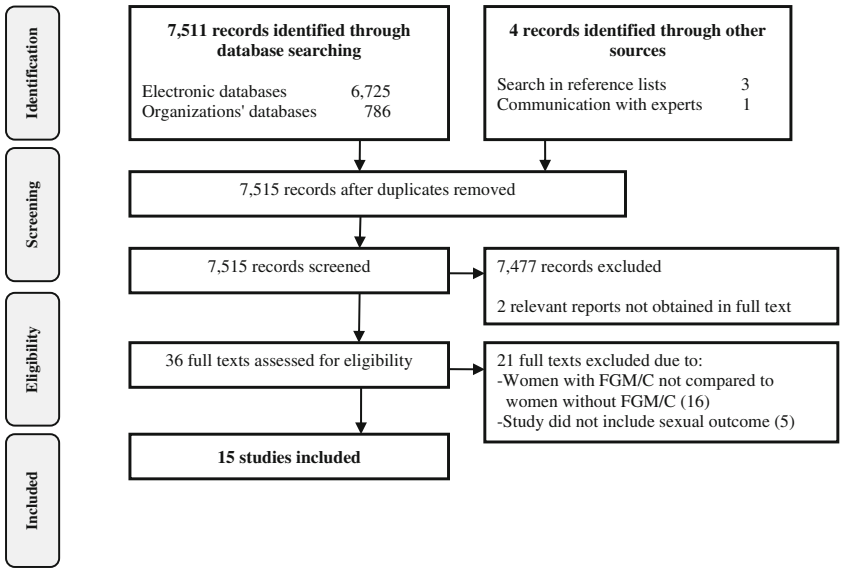

Fig. 1 PRISMA flow diagram of literature reviewing process

blind to whether participants were exposed or not. Lastly, several of the studies also failed clearly to show that the sample was representative of the population, that standardized data collection methods were used and that statistical methods were appropriate. Three studies (Morison et al. 2001; Okonofua et al. 2002; Stewart et al. 2002) controlled for confounders, such as age and parity.

With respect to grading of the evidence, evidence based on observational studies will generally be appreciably weaker than evidence from experimental studies with regards to establishing a causal relationship between exposure to a condition and an outcome. For resource reasons, we decided to assess the quality of the evidence through GRADE only for outcomes which were eligible for meta-analysis. The final grading for each outcome was 'very low', defined as 'any estimate of effect is very uncertain', because all the studies were (necessarily) non-randomized and the majority also had methodological shortcomings (details about methodological quality and GRADE assessments are available in Berg et al. 2010).

According to the study descriptions, 13 included studies employed a cross-sectional comparative study design and two studies were described as case–control. All studies were based on a non-random sample, with the possible exception of the study by Stewart et al. (2002). This study was based on a subsample of women from the 1994–1995 Central African Republic Demographics and Health Survey (DHS), which is a random household sample of the larger population. The majority of the studies were clinical-/hospital-based. In all the included studies, 'exposed' and 'unexposed' groups of women were compared. Shandall (1967) compared three groups of women: women with FGM/C type I, women with type III and women without any genital cutting. Thabet and Thabet (2003) compared four groups of women: women with FGM/C type I ('minorly circumcised'), women with type II or III ('circumcised mutilated'), women with any type of genital cutting who developed clitoral cysts as late complications of FGM/C and women without any genital cutting ('uncircumcised'). The remaining 13 studies compared women with FGM/C versus women without FGM/C. That is, different types of genital cutting were combined to make a binary variable of women with FGM/C versus women without FGM/C.

Population Included in the Studies

Collectively, the studies involved a total of 12,671 participants from seven different countries (Table 1). One study was from Saudi Arabia, while the remaining 14 studies were from countries in Africa: Central African Republic, Egypt, Gambia, Ghana, Nigeria and Sudan. Across the studies, the women's ages ranged from 15 to 60 with a mean age of about 32. In the majority of studies, the women were married. Ten studies stated the educational level of the women, which was generally low (few had education beyond high school). Two samples consisted of pregnant women. In nine of the 15 studies, the women were examined gynaecologically to confirm whether or not they had been genitally cut and, in some studies, to which type of FGM/C the women had been subjected. The remaining six studies relied on women's self-report. The great majority of the women had been subjected to FGM/C type I or II, but three quarters of the Sudanese women (Shandall 1967) and 42.3% of the residents of Saudi Arabia Alsibiani and Rouzi (2010) had FGM/C type III. In the majority of cases, the women had been subjected to FGM/C in early childhood (mean age 8.5), but some as late as adulthood during their

Table 1 Description of included studies (N=15)

Authors, years	Methodological study quality	Study design	Population	Outcome measurement
Adinma 1997	Low	Cross-sectional comparative. Clinical-/hospital-based	N=256, Nigeria (southeast). Married, pregnant Igbo women. Age 16–40 (91.4% 21–35 years). Gynaecological examination. 21.8% FGM/C type I, 78.2% type II; done in childhood (96.8%) or as teenager (3.2%). Complications: scarring	Measure = Female Sexual Functioning Index
Alsibiani and Rouzi 2010	Moderate	Prospective case–control. Clinical-/hospital-based	N=260, Saudi Arabia. Mean age 30.5 (16–40). 91% high school. 40.8% FGM/C type I /II, 42.3% type III, 16.9% unknown	Closed-ended single item questions
Badawi 1989	Low	Cross-sectional comparative. Purposive sampling	N=159, Egypt (Cairo). 76% were 20–39 years old. 37% married. 52% high school, 27% college. FGM/C: 'Genitally mutilated women'	Closed-ended single item questions
El-Defrawi et al. 2001	Moderate	Cross-sectional comparative. Clinical-/hospital-based	N=250, Egypt (Ismailia). Married. Gynaecological examination. FGM/C: 50% injury to clitoris, 36.5% excision of clitoris, 13% excision of clitoris and surrounding parts, done at mean age 10.8 (8–12). Complications: pain, bleeding, infection, swelling	Measure = Sexual Behaviour Assessment Schedule-Adult
Elnashar and Abdelhady 2007	Low	Cross-sectional comparative. Clinical-/hospital-based	N=264, Egypt (Benha city). Newly married (<5 years). 6.8% illiterate or elementary school. FGM/C: 'circumcised'	Closed-ended single item questions.
Elnashar et al. 2007	Low	Cross-sectional comparative. Clinical-/hospital-based	N=936, Egypt (Dakahlia governorate). Mean age 29.9 (16–49). 11.5% polygamous marriage, 88.4% monogamous marriage. 28.6% illiterate, 14.4% primary education, 48% secondary education. Gynaecological examination. FGM/C: 'first- or second-degree circumcision'	Closed-ended single item questions
Megafu 1983	Low	Cross-sectional comparative. Clinical-/hospital-based	N=500, Nigeria. Ibo (aka Igbo) women. 16–45 years old. 76% married with children. Gynaecological examination. 78.8% FGM/C type I, 21.2% type II. Done within first 8 days of life or near puberty	Closed-ended single item questions
Morison et al. 2001	High	Cross-sectional comparative. Community-based	N=1,157, Gambia (Farafenni area). Ethnicity: Mandinka, Wollof, Fula. Age 15–54. 51.7% in polygamous marriage. <6% primary or secondary education. Gynaecological examination. 0.5% FGM/C type I, 98% type II, 1.5% type III, done at mean age 6.1. Complications: bacterial vaginosis, herpes simplex virus 2	Closed-ended single item questions
Nwajei and Otino 2003	Low	Cross-sectional comparative. Cluster sampling	N=400, Nigeria (Abraka). Students from Delta State University. Ethnicity mainly Urhobo. 80% 16–21 years. FGM/C: 'circumcision (type I) done in this part of Nigeria. Only the clitoral hood is touched, largely leaving the clitoris intact … some girls undergo circumcision during their first pregnancy after marriage as required by the Urhobo culture.'	Closed-ended single item questions
Odoi et al. 1997	Low	Cross-sectional comparative. Clinical-/hospital-based	N=195, Ghana (north). Gynaecological examination. 100% FGM/C type I or II, age of cutting from early childhood to 18 years. Complications: haemorrhage, lacerations during first vaginal delivery	Closed-ended single item questions
Okonofua et al. 2002	Moderate	Cross-sectional comparative. Clinical-/hospital-based	N=1,836, Nigeria (Edo state). Pregnant. 93.2% married. 71.4% FGM/C type I, 24.4% type II, 2.9% type III, 1.3% type IV. Complications: scar formation, cysts, disfigurement, narrowed introitus	Closed-ended single item questions
Osinowo and Taiwo 2003	Low	Cross-sectional comparative. Purposive sampling	N=99, Nigeria (Lagos). Married. Mean age 34.1 (18–60). 41.1% primary education, 30.3% secondary education. FGM/C: 'circumcised'	Measure = Golombok Rust Inventory of Sexual Satisfaction

Table 1 (continued)

Authors, years	Methodological study quality	Study design	Population	Outcome measurement
Shandall 1967	Low	Cross-sectional comparative. Clinical-/hospital-based	*N*=4,024, Sudan (Khartoum area). Gynaecological examination. Complications: haemorrhage, shock, infection, scarring, Keloid formation, cysts, bacteriuria, chronic pelvic infection	Closed-ended single item questions
Stewart et al. 2002	High	Cross-sectional comparative. Subsample of DHS	*N*=2,188, Central African Republic. Age 15–49 (68.6% 20–39 years). Ethnicity: Banda, Mandjia. All women either married or cohabitating with partner, 27.6% in polygamous marriage. 62.2% no education, 30.6% primary education. 100% FGM/C type II ('clitoris and labia minora are partially or completely removed'), 54.6% cut >5 years prior to marriage, 45.4% cut within 5 years of marriage	Closed-ended single item questions
Thabet and Thabet 2003	Low	Case–control. Clinical-/hospital-based	*N*=147, Egypt (Cairo). Married. Age 18–28. Gynaecological examination. FGM/C done at mean age 9.0 (7–12)	Measure = Kasr El Aini sexual assessment questionnaire sheet

first pregnancy. Six studies reported physical complications among women with FGM/C, the most common of which were scarring and infections.

Outcomes

All outcomes were self-reported via either face-to-face structured interviews or paper-and-pencil questionnaires. Four studies applied a validated instrument to measure sexual functioning—none of the studies applied the same instrument—the remaining studies used closed-ended single item questions for current sexual functioning and satisfaction. Because the majority of participating women had been cut in early childhood and were presently in their early thirties when they were asked about current sexual functioning, for the great majority of women with FGM/C the event occurred several decades in the past and all consequences must be considered long term.

Consequences of FGM/C

The studies reported a total of 53 dichotomous outcomes for sexual consequences of FGM/C, the majority (58.5%) of which were statistically associated with FGM/C status at study level (Table 2). The outcomes of all 15 studies except one (Okonofua et al. 2002) suggested that there were detrimental consequences from FGM/C on women's sexual functioning. Four studies reported a total of 12 continuous outcomes for sexual consequences of FGM/C, the majority of which (74.0%) were statistically significant at study level (Table 3). In these studies, women with FGM/C reported experiencing significant less sexual desire and arousal, less satisfaction, as well as experiencing orgasm less frequently.

Results of Meta-analyses for Sexual Consequences

Some studies included the same outcome and were sufficiently similar to warrant pooling of effect sizes in meta-analyses. Altogether we could conduct meta-analyses for seven outcomes regarding sexual functioning. The final grading for each outcome was 'very low'. Regarding the outcome 'dyspareunia', we found a significant effect (five studies, RR=1.52, 95% CI=1.15, 2.0; Fig. 2). Women who had been subjected to FGM/C (type I/II) were 1.5 times more likely to experience pain during intercourse than women who had not been subjected to FGM/C. To examine the possible influence of including pregnant women in the model, we removed the study with pregnant women (Okonofua et al. 2002), finding no change in effect size.

We conducted meta-analysis of the outcome 'satisfaction', and as evident from the forest plot (Fig. 3), a significant effect was found (two studies, standardized mean diff=−0.34, 95% CI=−0.56, −0.13). Women who had been subjected to FGM/C experienced significantly less sexual satisfaction than women who had not been subjected to FGM/C. The finding in the meta-analysis was supported by results from two other studies. In Adinma's survey (1997), women with FGM/C were 2.48 times as likely to say they were not sexually satisfied (95% CI= 1.18, 5.21), and in another study (El-Defrawi et al. 2001), women with FGM/C were 3.14 times as likely to say they had no enjoyment of sex (95% CI=1.55, 6.36) compared to women without FGM/C.

For the outcome 'sexual desire', the result showed that women with FGM/C were twice as likely to report that they experienced no desire compared to women without FGM/C (two studies, RR=2.15, 95% CI=1.37, 3.36; Fig. 4). The

Table 2 Study outcomes (dichotomous) and effect estimates for sexual consequences

Authors, year	Outcome	FGM/C group	Non-FGM/C group	Results RR (95% CI)
Adinma 1997	Sexually satisfied ('no')	21/124 (16.9%)	9/132 (6.8%)	2.48 (1.18, 5.21)
	Satisfied ('very rarely')	7/124 (5.6%)	0/132 (0%)	15.96 (0.92, 276.54)
	Satisfied ('sometimes')	42/124 (33.9%)	40/132 (30.3%)	1.12 (0.78, 1.6)
	Satisfied ('yes')	11/124 (8.9%)	31/132 (23.5%)	0.38 (0.20, 0.72)
	Satisfied ('very often')	43/124 (34.7%)	52/132 (39.4%)	0.88 (0.64, 1.21)
Alsibiani and Rouzi 2010	Intercourse ≤3 times per week	117/130 (90%)	120/130 (92.3%)	0.97 (0.90,1.05)
Badawi 1989	No orgasm[a]	20/26 (75.0%)	67/133 (50.0%)	1.53 (1.17, 2.00)
El-Defrawi et al. 2001	No sexual desire	83/200 (41.5%)	8/50 (16.0%)	2.59 (1.35, 5.00)
	No enjoyment of sex	88/200 (44.0%)	7/50 (14.0%)	3.14 (1.55, 6.36)
	No foreplay	97/200 (48.5%)	28/50 (56.0%)	0.87 (0.65, 1.15)
	Never initiate sex	76/200 (38.0%)	16/50 (32.0%)	1.19 (0.76, 1.85)
	Dryness during intercourse	97/200 (48.5%)	15/50 (30.0%)	1.62 (1.03, 2.53)
	Dyspareunia	92/200 (46.0%)	16/50 (32.0%)	1.44 (0.93, 2.21)
	No orgasm	86/200 (43.0%)	9/50 (18.0%)	2.39 (1.29, 4.41)
Elnashar and Abdelhady 2007	Dyspareunia	81/200 (40.5%)	12/64 (18.8%)	2.16 (1.26, 3.70)
	No libido	57/200 (28.5%)	10/64 (15.6%)	1.38 (0.99, 3.36)
Elnashar et al. 2007	Sexual problems	587/845 (69.5%)	58/91 (63.7%)	1.09 (0.93, 1.28)
Megafu 1983	No orgasm	140/340 (41.2%)	50/160 (31.2%)	1.32 (1.01, 1.71)
	Clitoris most erotic organ	80/340 (23.5%)	70/160 (43.8%)	0.54 (0.41, 0.70)
	Breasts most erotic organ	80/340 (23.5%)	30/160 (18.8%)	1.25 (0.86, 1.83)
	Lips most erotic organ	20/340 (5.9%)	10/160 (6.3%)	0.94 (0.45, 1.96)
	Labia minora most erotic organ	120/340 (35.3%)	30/160 (18.8%)	1.88 (1.32, 2.68)
Morison et al. 2001	Painful sex	62/394 (15.7%)	47/329 (14.3%)	1.10 (0.78, 1.56)
Nwajei and Otino 2003	No intercourse ever	15/120 (12.0%)	6/280 (2.0%)	5.83 (2.32, 14.67)
	Intercourse once in 6 months	9/120 (8.0%)	0/280 (0%)	44.12 (2.59, 752.06)
	Intercourse once in 3 months	15/120 (12.0%)	0/280 (0%)	71.99 (4.34, 1,193.49)
	Intercourse once a month	19/120 (16.0%)	64/280 (23.0%)	1.59 (0.93, 2.71)
	Intercourse 1 to 2 times per week	24/120 (20.0%)	120/280 (43.0%)	0.47 (0.32, 0.68)
	Intercourse ≥3 times per week	38/120 (32.0%)	90/280 (32.0%)	0.99 (0.72, 1.35)
	Clitoris most sensitive organ	49/120 (41%)	143/280 (51%)	0.80 (0.63, 1.02)
	Vagina most sensitive organ	25/120 (21%)	11/280 (4%)	5.30 (2.70, 10.43)
	Tongue most sensitive organ	21/120 (17%)	25/280 (9%)	1.96 (1.14, 3.36)
	Breasts most sensitive organ	25/120 (21%)	101/280 (36%)	0.58 (0.39, 0.85)
Odoi et al. 1997	No orgasm	9/76 (11.8%)	0/119 (0%)	29.61 (1.75, 501.45)
	Dyspareunia	10/76 (13.2%)	6/119 (5.0%)	2.61 (0.99, 6.89)
	Post-coital bleeding	4/76 (5.3%)	0/119 (0%)	14.03 (0.77, 256.88)
Okonofua et al. 2002	No sexual activity in last wk	364/827 (44.0%)	535/1,009 (53.0%)	0.83 (0.75, 0.91)
	No sexual activity last month	158/827 (19.1%)	289/1,009 (28.6%)	0.67 (0.56, 0.79)
	Not easily aroused	558/827 (67.5%)	656/1,009 (65.0%)	1.04 (0.97, 1.11)
	Never initiate sex	345/827 (41.7%)	477/1,009 (47.3%)	0.88 (0.80, 0.98)
	No orgasm	280/827 (33.9%)	410/1,009 (40.6%)	0.83 (0.74, 0.94)
	Pain during intercourse	30/825 (3.6%)	23/1,003 (2.3%)	1.59 (0.93, 2.71)
	Clitoris most sensitive part	87/827 (10.5%)	276/1,009 (27.4%)	0.38 (0.31, 0.48)
	Breasts most sensitive part	523/827 (63.2%)	439/1,009 (43.5%)	1.45 (1.33, 1.59)
	Other part most sensitive	217/827 (26.2%)	294/1,009 (29.1%)	0.90 (0.78, 1.05)
Shandall 1967	Never had orgasm	TI 98/807 (12.1%)	14/204 (6.9%)	1.77 (1.03, 3.03)
		TIII 2,520/3,013 (83.6%)		12.19 (7.35, 20.21)
	Orgasm <50% of occasions	TI 139/807 (17.2%)	29/204 (14.2%)	1.21 (0.84, 1.75)
		TIII 162/3,013 (5.4%)		0.38 (0.26, 0.55)

Table 2 (continued)

Authors, year	Outcome	FGM/C group	Non-FGM/C group	Results RR (95% CI)
	Orgasm 50–75% of occasions	TI 300/807 (37.2%)	61/204 (29.9%)	1.24 (0.99, 1.56)
		TIII 180/3,013 (6.0%)		0.20 (0.16, 0.26)
	Orgasm >75% of occasions	TI 270/807(33.5%)	100/204 (49.0%)	0.68 (0.58, 0.81)
		TIII 151/3,013 (5.0%)		0.10 (0.08, 0.13)
Stewart et al. 2002	Intercourse ≥5 times last month	633/1,346 (47%)	328/842 (39%)	1.21 (1.09, 1.34)

Cyst any FGM/C + cyst, *FSFI* Female Sexual Functioning Index, *TI* FGM/C type I, *TIII* FGM/C type III

[a] Orgasm from manual stimulation of the clitoris/clitoral area

finding that women with FGM/C were less likely to say that they experienced sexual desire was also supported by continuous outcome results in other studies. Alsibiani and Rouzi (2010) as well as Thabet and Thabet (2003) found that women who had been subjected to FGM/C reported lower sexual desire and arousal scores (mean diff=−0.6, 95% CI=−0.92, −0.28 and mean diff=−3.2, 95% CI=−3.6, −2.8, respectively), and El-Defrawi et al. (2001) similarly found that women with FGM/C self-reported a lower frequency of sexual desire than women without FGM/C (mean diff=−0.9, 95% CI=−1.48, −0.32).

Two studies (El-Defrawi et al. 2001; Okonofua et al. 2002) measured differences between women with FGM/C (type I/II) and women without FGM/C with respect to whether they initiated sex. No significant difference for the outcome 'never initiate sex' was found (two studies, RR=0.94, 95% CI=0.74, 1.21; Fig. 5).

We conducted meta-analysis of the outcome 'experience orgasm' (none of the studies explained how they defined orgasm; Fig. 6). The women were from four different countries in Africa and FGM/C type included I–III. No significant effect for orgasm was found (five studies, RR=1.5, 95% CI=0.93, 2.44). Considerable heterogeneity indicated by I^2 and chi^2 (I^2=87%, chi^2=31.2, p=0.00001) showed inconsistency across studies. To examine the possible influence of including pregnant women in the model, we removed the study with pregnant women (Okonofua et al. 2002) from the analysis. The effect

Table 3 Study outcomes (continuous) and effect estimates for sexual consequences

Authors, year	Outcome	FGM/C group	Non-FGM/C group	Results mean diff (95% CI)
Alsibiani and Rouzi 2010	Desire	3.6 (SD=1.1)	3.7 (SD=1.2)	−0.1 (−0.38, 0.18)
	Arousal	3.6 (SD=1.2)	4.2 (SD=1.4)	−0.6 (−0.92, −0.28)
	Lubrication	3.4 (SD=1.0)	3.9 (SD=1.3)	−0.5 (−0.78, −0.22)
	Orgasm	3.7 (SD=1.2)	4.2 (SD=1.4)	−0.5 (−0.82, −0.18)
	Satisfaction	4.5 (SD=1.2)	5.0 (SD=1.4)	−0.8 (−1.12, −0.48)
	Pain	3.5 (SD=1.0)	3.8 (SD=1.1)	−0.3 (−0.56, −0.04)
	FSFI score	21.4 (SD=4.4)	23.5 (SD=5.0)	−2.1 (−3.24, −0.96)
El-Defrawi et al. 2001	Sexual desire	2.8 (SD=1.7)	3.7 (SD=1.9)	−0.9 (−1.48, −0.32)
Osinowo and Taiwo 2003	Sexual functioning	78.9 (SD=18.3)	96.4 (SD=10.1)	−17.5 (−23.23, −11.77)
Thabet and Thabet 2003	Desire and arousal	TI 9.4 (SD=0.8)	10.4 (SD=0.8)	−1.0 (−1.4, −0.6)
		TII&III 7.2 (SD=0.8)		−3.2 (−3.6, −2.8)
		Cyst 11.2 (SD=1.0)		0.8 (0.41, 1.19)
	Satisfaction	TI 8.3 (SD=1.1)	8.0 (SD=0.9)	0.3 (−0.21, 0.81)
		TII&III 7.3 (SD=0.8)		−0.7 (−1.13, −0.27)
		TI–III 7.8 (SD=0.96)[a]		−0.2 (−0.6, 0.2) [a]
		Cysts 8.0 (SD=0.9)		0.0 (−0.4, 0.4)
	Orgasm	TI 12.4 (SD=1.7)	12.5 (SD=1.1)	−0.1 (−0.82, 0.62)
		TII&III 6.0 (SD=0.9)		−6.5 (−7.01, −5.99)
		Cysts 10.9 (SD=1.2)		−1.6 (−2.1, −1.1)

Cyst Any FGM/C + cyst, *FSFI* Female Sexual Functioning Index, *TI* FGM/C type I, *TIII* FGM/C type III, *TII&III* FGM/C types II and III, *TI–III* FGM/C type I, II and III combined as one group

[a] We combined the two groups FGM/C type I and types II and III

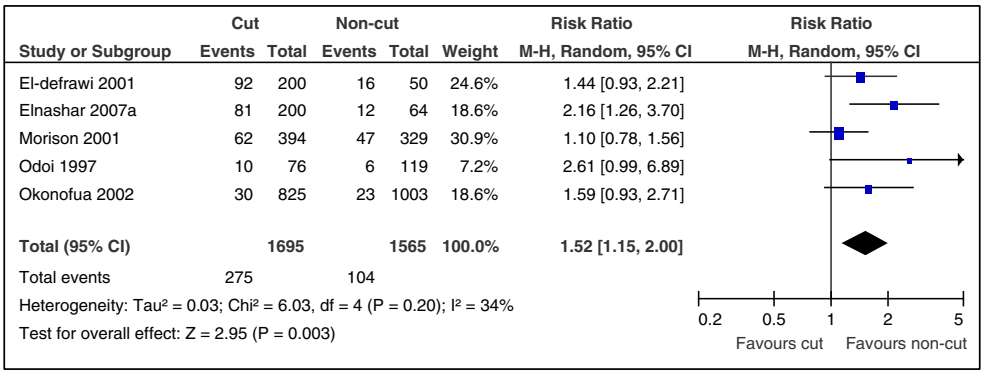

Fig. 2 Forest plot, dyspareunia

became significant (RR=1.85, 95% CI=1.12, 3.06), but heterogeneity remained high (I^2=64%, chi^2=8.41, p=0.04). Support for the finding that women with FGM/C may be more likely not to experience orgasm came from three studies with continuous estimates for orgasm (Alsibiani and Rouzi 2010; Shandall 1967; Thabet and Thabet 2003). All reported that women with FGM/C experienced orgasm significantly less frequent than women who had not been subjected to FGM/C.

Three studies (Megafu 1983; Nwajei and Otino 2003; Okonofua et al. 2002) asked what women thought was the most sensitive part of their body and included the answer alternative 'clitoris'. There was a significant effect (three studies, RR=0.55, 95% CI=0.35, 0.85), but the findings were inconsistent across studies (statistical tests for heterogeneity: I^2=90%, chi^2=19.78, p=0.0001; Fig. 7). The same three studies (Megafu 1983; Nwajei and Otino 2003; Okonofua et al. 2002) asked what women thought was the most sensitive part of their body and included the answer alternative 'breasts'. No significant effect was found (three studies, RR=0.91, 95% CI=0.62, 1.33), and considerable heterogeneity indicated by I^2 and chi^2 (I^2=97%, chi^2=73.14, p=0.00001) showed inconsistency across studies (Fig. 8).

Discussion

This systematic review synthesized empirical data from 15 studies assessing the sexual consequences of FGM/C. The effect size estimates for dyspareunia, sexual satisfaction and sexual desire provide evidence in support of the argument that FGM/C is associated with attenuation of a woman's sexual functioning.

Main Results and Implications

Given the mechanisms of sexual response in women have not been clearly delineated (Yang et al. 2000), we can neither easily explain the mechanism of the association between painful sexual intercourse and FGM/C, nor between reduced sexual satisfaction and FGM/C. However, we propose the mechanism of the relationships is physiologically based.

Vasocongestion of the erectile tissues and the consequent lubrication of the vagina form one of the initial phases of the sexual response cycle of both Masters and Johnson's model (Masters and Johnson 1966) and Kaplan's (1974) triphasic model and has a place within also the more recent biopsychosocial models (Bancroft 2002; Basson 2001; Levin 2002). While the limbic system in the brain and hormones influence and may also produce sexual responses, it is largely neural mechanisms that make sexual responses possible (Hyde and Delamater 2006; Yang et al. 2000; Traish et al. 2002). With FGM/C, there are injured clitoral nerves and related receptors and various forms of scarring and adhesions around the excised genital parts (Thabet and Thabet 2003; WHO 2008; WHO Study Group 2006). The areas surrounding excised genital tissues are less receptive to tactile stimulation than intact genital tissues (Elnashar and Abdelhady 2007; Thabet and Thabet 2003). In fact, cutting the vulva may damage neural innervations much the same way as radical vulvectomy following cancer (Einstein 2008). Critical vascular tissues,

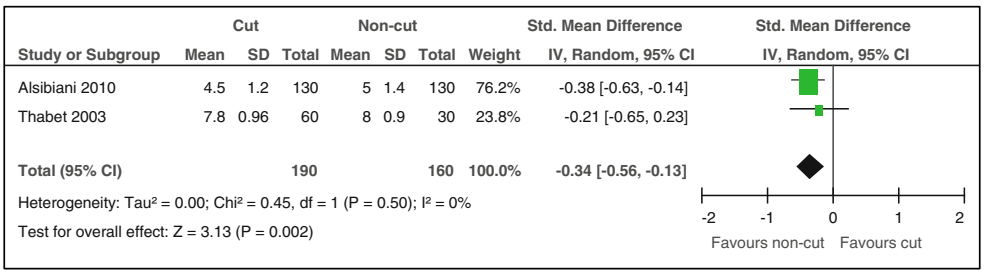

Fig. 3 Forest plot, satisfaction

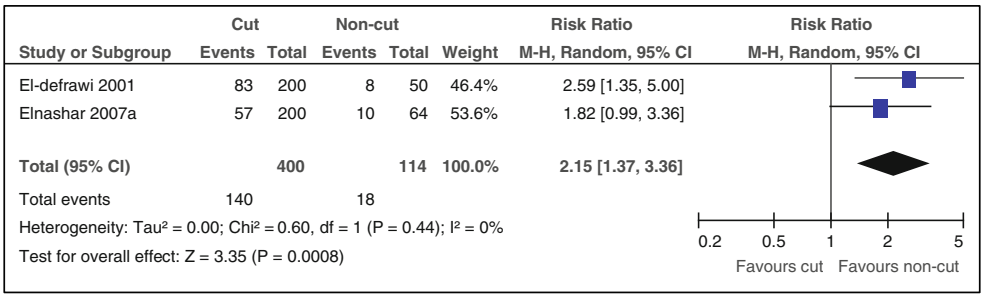

Fig. 4 Forest plot, no sexual desire

important for female sexual response (Yang et al. 2005), may not only be damaged but partially missing in some women with FGM/C. Recall that anatomical studies show that the specialized sensory nerves of the clitoris, the only function of which is to produce sexual arousal, are concentrated in a rich neurovascular area of only a few centimetres (Baskin et al. 1999; Hyde and Delamater 2006). It is reasonable therefore that researchers warn against disrupting the somatosensory innervation of the glans clitoris (Baskin et al. 1999; Einstein 2008; Yang et al 2005). Einstein (2008) convincingly argues that FGM/C may through its potential effects on the central nervous system affect the entire body via neural rewiring. We do not assert that capacity for sexual enjoyment depends on intact clitoris tissue, but it is an important part of female sexual response.

Further, healing from any type of cutting inevitably involves scar formation and pain in incision scars is ubiquitous, occurring through neuropathic pain mechanisms (Steege and Zolnoun 2009). Likely, vulvae damage reduces the flexibility and sensitivity of critical genital tissue and may produce tearing during intercourse. It has been proposed that dyspareunia results from the scarring over the vulva after FGM/C and pain may be caused by friction during intercourse because of traumatic neuroma at the site of the excision (Elnashar and Abdelhady 2007). All but one of the studies included in the meta-analysis for dyspareunia reported physical complications among women with FGM/C, generally scarring and infections, as the great majority of the women had FGM/C type I or II. For women with FGM/C type III, the pain may be greater because infibulation creates a narrowed introitus (often a pinhole-sized opening) that is a mechanical obstruction. Nour et al. (2006) write that since the infibulations must be opened up either surgically or through penetrative sex, sexual intercourse, especially in the first months of sexual intercourse, is frequently painful for the women. Such pain is reported in the literature (Asali et al. 1995; Dopico 2007; Johansen 2007; Lightfoot-Klein 1989).

We recognize that sexual pleasure and satisfaction are multidimensional, depending, for example, also on affection and the time the partner takes to please the woman (Catania et al. 2007). However, the physiological viewpoint not only helps explain dyspareunia and reduced sexual satisfaction but also the experience of dryness during intercourse, which was found to be a greater problem among women with FGM/C than in women without FGM/C in both studies assessing this outcome (Alsibiani and Rouzi 2010; El-Defrawi et al. 2001). Raina et al. (2007) state that dyspareunia is often seen in women with decreased vaginal lubrication.

Again, with an understanding that humans' sexuality is a complex interaction of biopsychosexual (Leiblum 2000), cognitive–affective (Basson 2001), neurophysiological and biochemical mechanisms (Levine 2003), it is possible that women with FGM/C have an ability to compensate for anatomical damage to their genital tissue through enhancement of other sensory and erotic areas, or emotions and fantasy (limbic system). In fact, some researchers (e.g. Lightfoot-Klein 1989) suggest that sexual sensations in women with FGM/C may be maintained by a shift of the point of maximal sexual stimulation from the clitoris and/or labia to other areas of the body. Some support for this hypothesis was found in our systematic review, but considerable heterogeneity showed inconsistency across studies and our meta-analysis results were inconclusive.

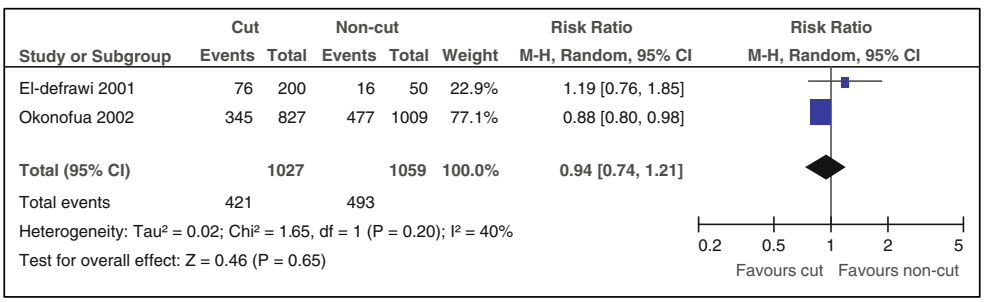

Fig. 5 Forest plot, never initiate sex

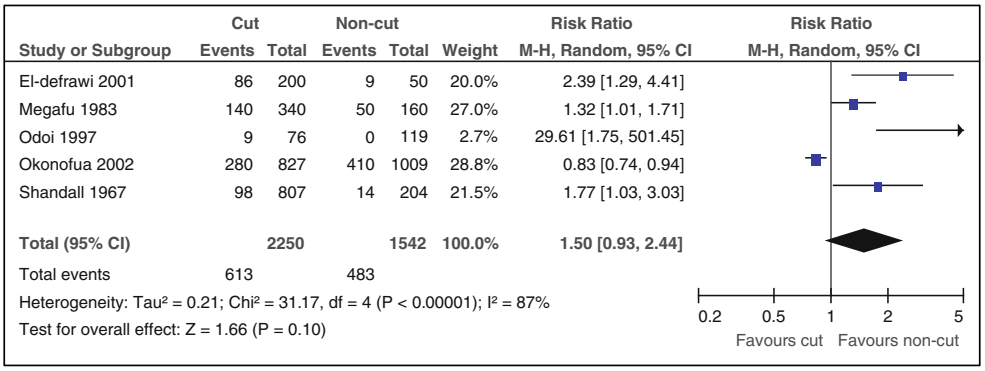

Fig. 6 Forest plot, no orgasm

The proposition regarding a possible compensatory sexual adjustment in women with FGM/C is of interest and should be investigated in future studies. It serves as a reminder that with FGM/C, some essential structures for sexual stimulation and pleasure have been excised, although not all—in many women, an intact clitoris is buried beneath the infibulation scar (Johansen 2007; Nour et al. 2006).

The observed greater likelihood of sexual desire among women without FGM/C than those with FGM/C is not easily explained. According to research, disruption of genital somatosensory tissue does not appear to affect desire (Yang et al. 2000). However, it is possible that the result is related to conditioning. According to Bancroft (2002) and Basson (2001), psychological factors such as previous negative sexual experiences may result in dissociation and avoiding, rather than seeking out sexual stimuli. As delineated, many women with FGM/C appear to experience pain during intercourse and impairment of sexual satisfaction. Repeated dissatisfactory sexual activity may affect women's sexual response (learned inhibition), evident as reduced desire in women. The same may be the case for initiation of sexual activity, the result for which was inconclusive in our analysis. Both of these outcomes were only measured in two studies and further research is warranted. Similarly, the result of our meta-analysis for orgasm, another central phase of the sexual response cycle, was inconclusive. However, it is in line with our other results that at study level, seven of the eight studies measuring orgasm found that women with FGM/C were less likely to experience orgasm. Hence, orgasm may be part of a symptom constellation of the potential detrimental sexual consequences of FGM/C. The consequences of FGM/C on women's orgasm are another obvious area for future research.

A relevant question is whether there is a dose–response relationship involved in FGM/C and sexual functioning. In view of our physiological position, it is probable that a woman's sexual functioning is affected according to the age at which it was done, the healing process and the extent of excision of genital tissue (rather than closing of the vulva), the severity of which is influenced by type of operator, cutting instrument and the use of antiseptics and anaesthetics. For years, researchers (e.g. Cutner 1985; Shandall 1967; WHO 2008) have proposed that the more severe the woman's excision, the more likely adverse consequences are, and there is some evidence to this effect. Almroth et al. (2005) concluded that the anatomical extent of FGM/C, rather than whether the vulva had been sewn, was linked to infertility. A positive relationship was also found between the type of FGM/C and the likelihood that a woman would have a long-term gynaecological or obstetric complication, or a genital infection (Jones et al. 1999). With respect to sexual functioning specifically, the dose–response question cannot be answered by this systematic review as we were only able to identify two studies which investigated differences between types of FGM/C, with insufficient similarity to allow for pooling of effect estimates. This issue can only be conclusively determined with intensified research efforts. However, since the studies included in the meta-analyses for dyspareunia, sexual satisfaction and

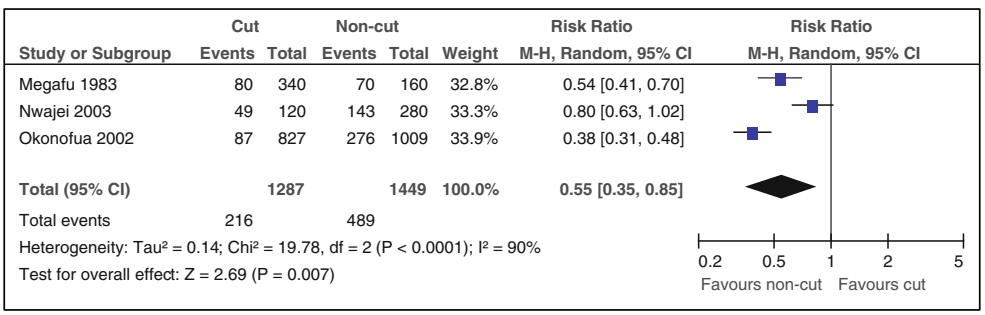

Fig. 7 Forest plot, clitoris most sensitive area of the body

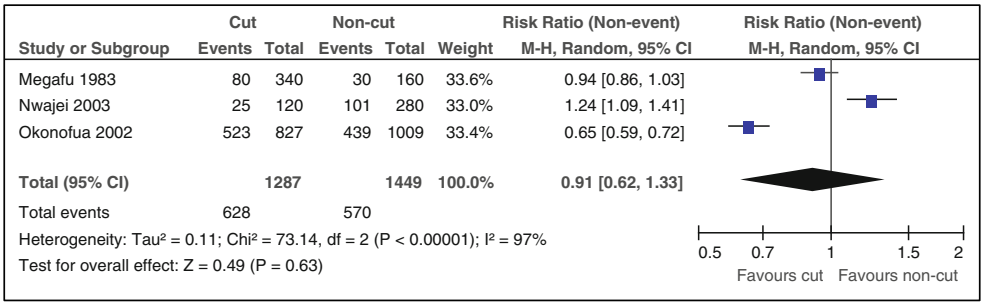

Fig. 8 Forest plot, breasts most sensitive area of the body

sexual desire included mostly women with FGM/C type I or II, but also some with type III, it would appear that FGM/C of any type may be associated with sexual problems (for type IV it is unknown). This is supported by results from Thabet and Thabet (2003) as well as Shandall (1967).

With respect to implications, the low quantity and quality of the evidence has clear bearing on arguments for increased research efforts to investigate the possible sexual harms from FGM/C. Comparative, multi-centre studies (e.g. similar to the WHO obstetric study (WHO Study Group 2006)), such as prospective cohort studies, are recommended. Research initiatives should compare representative and clearly defined groups of women that differ by the extent of FGM/C, whereby classification is based on gynaecological examination by trained personnel. We recognize that gynaecological examination of FGM/C is subject to variation (interindividual and intra-individual), similar to radiology imaging interpretation there is a subjective element, but it is currently the best classification method available. Moreover, future studies should compare women with varying degrees of FGM/C to shed light on the possible dose–response relationship involved in FGM/C and recruit young women so that also short-term consequences of FGM/C can be better understood. To enhance validity and value relevance, standardized data collection methods should be used, outcomes should be identified by women as germane to their lived experiences and inventories and scales used to quantify and register sexual functioning status should be validity and reliability tested with the target populations.

Given FGM/C militates against a satisfactory sexual life of the affected woman, FGM/C should not be encouraged. Intervening preventatively and dissuading practising communities from continuing the practice present proactive strategies, which not only would be consistent with international condemnation of FGM/C but cost-effective. According to research by Adam et al. (2010), the cost of government efforts to prevent FGM/C would be offset by savings from preventing obstetric, gynaecological and psychosexual complications. Abandonment campaigns could highlight the detrimental sexual consequences from FGM/C for women, including pain and reduced satisfaction, as well as for their male partner. Research shows that the most frequently mentioned male sexuality-related complications are wounds, bleeding and infection on the penis, difficulty in penetration and psychological problems. Notably, that the wife experienced decreased sexual enjoyment and suffered during sexual intercourse affected sexual satisfaction negatively for the man (Abdal Magied and Musa 2004; Almroth et al. 2001). Such data, combined with the present findings, suggest possible ways to encourage abandonment of the practice, especially since male satisfaction is often mentioned by women as a reason for performing FGM/C (Berg and Denison, submitted for publication). Moreover, because it seems that in Islam both the husband and the wife have a right to sexual satisfaction (Roald 2001), the argument of a right to sexual satisfaction in marriage justified by Islamic teachings could be advanced as a reason in abandonment efforts.

Because awareness of the practice and its likely complications will facilitate prevention and optimal management, inclusion of sexuality sensitive FGM/C awareness messages in media should be considered for communities where FGM/C frequently occurs. Further, as mentioned above, it is possible that some women have an ability to compensate for anatomical damage to their genital tissue through refocused development of other sensory and erotic areas, or emotions and fantasy. Sexual therapy and education, individual and couple, could be offered to women with FGM/C who want that. Given some women believe that men want a tight opening, women could be instructed in how to use their vaginal muscles and do Kegel exercises to strengthen them. They could also be encouraged to use safe, astringent herbs to tighten the vagina, an established practice in several communities where FGM/C occurs (Hilber et al. 2010).

Other pragmatic assistance includes treatment with dopamine agonists, such as apomorphine, to enhance sexual response (Bancroft 2002) and surgical operations for those women who want and have access to that. In case of infibulations, defibulation could be proposed because it is part of the psychosexual therapy for painful penetration and dyspareunia and because it promotes women's health by rendering gynaecological screenings and vaginal delivery easier and by decreasing the risk of urogenital infections

(Abdulcadir et al. 2011). While surgical options may be unrealistic for most women suffering consequences from FGM/C, reports confirm that women with FGM/C are seeking such assistance (Foldes and Louis-Sylvestre 2006; Morison et al. 2004; Villani 2009). Deinfibulation and clitoral restoration/reconstruction have been found to improve sexuality in women with FGM/C (Foldes and Louis-Sylvestre 2006). Nour et al. (2006) found that defibulation resolved nearly all cases of dyspareunia and helped restore the external genitalia of women with an intact clitoris, which was buried beneath the scar in 48% of deinfibulated women. In post-interviews, all women and their husbands stated that sexual intercourse had improved. In another study, clitorolabial reconstruction was followed by significant improvement in sexual functioning (Thabet and Thabet 2003).

Due to the arrival of immigrants from countries where FGM/C is practised, Western countries such as Norway, Sweden, the UK and the USA have introduced specific norms governing FGM/C, including legislation, recommendations on health promotion, care of women who have been subjected to the practice and training of medical professionals (Krása 2010). However, according to the WHO (2010), in most countries where FGM/C is prevalent, there is an absence of clear policies, protocols, manuals and guidelines for the healthcare sector of how to deal with issues related to FGM/C. In fact, only a handful of institutions that train healthcare professionals have included comprehensive knowledge of FGM/C in their curricula, and healthcare providers report that they have insufficient understanding and skills about how to care for women who suffer complications. In countries where FGM/C frequently occurs, medical students and healthcare professionals should receive comprehensive pre- and in-service curricula and training on aspects relevant to FGM/C, including its relationship with sexuality. Because of the topic's sensitive and often taboo status, a worksheet to facilitate professional communication and management of women with FGM/C may be helpful. Additionally, we agree with the WHO that appropriate national authorities should develop guidelines for various healthcare providers on how to deal with issues related to FGM/C, such as how to deal with sexuality-related consequences (WHO 2010). Lack of appropriate training and relevant experience for healthcare professionals could lead to insufficient attention to the issue, insensitive behaviour and inadequate care. Sound awareness and knowledge of the issue are important conditions for an appropriate handling of FGM/C that should be gained during medical studies. The health professionals who typically have status in communities could play a key role in not only counselling and treating women but also supporting abandonment of the practice, for example, by refraining from performing reinfibulations as people are increasingly turning to healthcare providers to perform the procedure (WHO 2008).

Strengths and Limitations

A strength of our systematic review is the comprehensive and systematic literature search and systematic process for identifying relevant publications. Further, as encouraged by researchers in the field (e.g. Askew 2005), we included controlled studies, i.e. study designs which could expose consequences of being subjected to FGM/C on sexual health outcomes. By examining evaluations with a comparison group, we partially controlled for environmental stimulation, which seems important as sexuality is not culture neutral but must be considered in the context in which a woman and her partner live. We estimated the likelihood of sexual consequences in women with FGM/C versus women without FGM/C, expressed as relative risk or mean difference, and in some cases meta-analyses could be performed.

Strengths notwithstanding, our systematic review has some limitations, including that it may be subject to publication bias. Identifying all studies addressing the question of the systematic review is not always possible, and non-identified studies may differ systematically from the ones identified, the likeliest scenario being that the results of the present systematic review are biased to the positive. Further, we failed to obtain two identified, and possibly relevant, records in full text (Abd El-Hady and El-Nashar 1998; Omara 1994), despite extensive retrieval efforts. Caution is warranted in interpreting the results of our systematic review, given the quality of the evidence was too low to warrant conclusions about a causal relationship between FGM/C and sexual consequences, largely due to the weaknesses of the observational design of all included studies. Importantly, this included that the composition characteristics of the groups, e.g. the variability of extent of cutting and age at which it was performed, may have had an influence on the results. In the included studies, the great majority of the women had been subjected to FGM/C type I or II, but most studies conflated FGM/C types I–III as having FGM/C. We were therefore unable to compare the various types of FGM/C. We also recognize the limits of self-reported FGM/C status (used in six studies). Research has shown that both validity and reliability of self-reporting of FGM/C are variable. Generally, study results suggest that most women can correctly say whether or not they have been genitally cut but are less able to correctly determine the extent of cutting (see, e.g. Adinma 1997; Elmusharaf et al. 2006; Okonofua et al. 2002; Snow et al. 2002). Further, methods of recruitment may have introduced sampling bias. Specifically, the women with FGM/C in these samples may not be

representative of the general population of women with FGM/C regarding factors such as complications. Also measurements of the sexual consequences were complicated in the included studies. Because most sexual functioning is not amenable to direct physical measurement, the outcomes dealt with in this systematic review relied on women's reports of their experiences. The perceived restrictions (e.g. cultural) to answer such questions honestly vary, thus misreporting in the included studies is possible. Related, there was a lack of validity and reliability tested measures in all but two of the studies (El-Defrawi et al. 2001; Osinowo and Taiwo 2003). Superimposed on the difficulty of validated measurement is the lack of a unified approach and definitions to measure sexual functioning in the included studies, which meant that we were in many cases unable to conduct meta-analyses.

Conclusions

The sexual consequences of FGM/C are an under-researched and neglected issue. The full range of the sexual consequences of subjecting girls and young women to the various types of FGM/C has yet to be evaluated and further research is needed. The low quality of the body of evidence included in our systematic review limited our ability to draw solid conclusions. However, our results substantiate the proposition that a woman whose genital tissues have been partly removed is more likely to experience increased pain and reduction in sexual satisfaction and desire.

Acknowledgements We are grateful to the Norwegian Centre for Violence and Traumatic Stress Studies for providing financial support for the systematic review. Thank you to R. Elise Johansen, Susan Munabi-Babigumira and Tove Ringerike for valuable comments to earlier drafts of the systematic review.

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References of the 15 studies included in the systematic review are identified in bold.

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