

Review

Female urinary incontinence in sub-Saharan Africa

Danielle Whiting¹ , Asiimwe Ian Shane², Rachel Pope³, Stephen Payne⁴  and Suzie Venn^{1,4}¹University Hospitals Sussex NHS Foundation Trust, Worthing, UK, ²Arua Regional Referral Hospital, Arua, Uganda, ³Cleveland Medical Center, Urology Institute, University Hospitals, and ⁴Urolink, British Association of Urological Surgeons, London, UK

Abstract

Urinary incontinence (UI) is highly prevalent amongst women around the world. In this review article we explore UI, its consequences and treatment in sub-Saharan Africa, providing specific examples from Uganda and Malawi. In sub-Saharan Africa the prevalence of UI is difficult to assess because of the wide variation in reporting resulting from patients hiding their condition due to the associated stigma in many communities. Whilst much of the literature from low- or low-middle-income countries focuses on UI from pelvic floor fistula, recent evidence demonstrates that non-fistulous stress, urgency and mixed UI are highly prevalent in sub-Saharan Africa. Incontinence secondary to vesico-vaginal fistula can be related to obstetric causes, mainly obstructed labour. The risk factors for non-fistulous incontinence are similar to those identified in high-income countries, including high parity, vaginal and assisted delivery, gestational age, constipation, obesity, chronic cough and ageing. Urinary incontinence has significant social and emotional consequences, with a high proportion of women in African countries reporting relationship problems, depression and suicidal ideation. There is poor understanding of the perceived aetiology of incontinence in sub-Saharan Africa, which may, in part, act as a barrier for women to seek medical advice. Innovative solutions have been found to manage the large number of obstetric fistulas that are prevalent across Africa, but a lack of capacity in specialists trained to treat women with UI means that more doctors, medical officers and better resource prioritization will be required to help the, as yet unquantified, number of women with non-fistulous leakage. Better patient peri-natal education may reduce the incidence of fistula still further, especially if the stigma felt by women with incontinence is overcome and they are encouraged to seek treatment.

Keywords

urinary incontinence, women, obstetric fistula, sub-Saharan Africa, treatment

Introduction

Urinary incontinence (UI), defined as the complaint of involuntary loss of urine, is estimated to affect over 300 million women worldwide [1]. In sub-Saharan Africa (SSA) UI is often discussed in relation to vesico-vaginal fistula (VVF) [2,3] causing continuous urinary incontinence (CUI) [4]; it had been thought that other forms of UI, such as stress urinary incontinence (SUI) [5], were not nearly as prevalent. Recent evidence, however, suggests this is not the case and that other forms of female incontinence are just as common [6]. In this review article we explore the prevalence, aetiology and impact of female UI in SSA as well as some of the current provisions for its treatment.

Prevalence

Both the prevalence and incidence of UI in SSA are difficult to estimate due to a lack of both locally collected data and possibly inaccurate assumptions from other sources. Whilst many observational studies have attempted to evaluate the prevalence of UI, they almost certainly underestimate the

disease burden due to a lack of reporting. A recent systematic review and meta-analysis, including 17 863 women from nine countries in SSA, provides us with the best current estimate of prevalence of 21% across all of the included studies [6]. However, even this comprehensive review showed significant heterogeneity amongst the included studies, with a prevalence ranging from 0.6% in Sierra Leone to 42.1% in Tanzania in the context of similar socio-economic populations. Other studies have similarly struggled with reporting of urinary leakage, which may be explained by patients hiding their condition out of embarrassment, shame or lack of trust in the healthcare system, as well as a lack of knowledge and understanding of incontinence as a treatable condition and not a natural process of ageing [7].

The prevalence of the subtypes of UI are even more difficult to assess in SSA. A meta-analysis of national household survey data obtained from the Demographic and Health Surveys and Multiple Indicator Cluster Surveys, household-based surveys using a multistage stratified cluster sampling design to select a nationally representative sample of women of reproductive age, estimated the lifetime prevalence rate of

VVF to be 3 per 1000 women of reproductive age in SSA [8]. The World Bank estimated that the annual global prevalence of VVF was 50–100 000, in 2015, of which 50–90 000 cases occurred in SSA [3]. There are many fewer studies that explore non-fistulous UI (n-fUI), which incorporates SUI, urgency UI (UUI) and mixed UI (MUI), as this was not thought to be such a prevalent health concern [3]. Studies demonstrating a lower prevalence of SUI in Black African women believed this to be attributable to differences in connective tissue among races [9]. However, analysis of 14 of the included studies in the recent systematic review by Ackah et al. shows estimated prevalences of SUI of 52%, UUI [10] of 21% and MUI [11] of 27% [6]. This highlights the significant burden of pelvic floor fistula causing UI and n-fUI that is borne by the female populations of low- or low-middle-income countries (LMICs) in SSA.

Aetiology

Fistulous urinary incontinence

In LMICs, over 90% of VVF cases have an obstetric aetiology, most commonly associated with obstructed labour. During normal labour, the anterior vaginal wall, bladder base and urethra are compressed between the foetal head and posterior surface of the pubic symphysis. In prolonged, obstructed labour, the intervening tissues become ischaemic with subsequent development of a fistula and incontinence [12]. Common reasons for obstructed labour include cephalo-pelvic disproportion and foetal malpresentation. The cephalo-pelvic disproportion may be due to a small pelvis, maternal malnutrition or previous infections, and women of short stature, women who were young at time of first intercourse and women who were young at time of first birth are particularly at risk [8]. Younger women with small pelvises and an increased diameter of malpresentation of the presenting part are at significant risk of obstructed labour [13]. Obstetric fistulas can also be iatrogenic and related to accidental injury during Caesarean or instrumental delivery, or can occur after symphysiotomy performed to address cephalo-pelvic disproportion.

Traumatic VVFs can result from non-obstetric causes, such as sexual violence or female genital mutilation (FGM), but are much

less common. Sexual violence has been clearly demonstrated as a risk factor for the development of VVF in SSA, with the incidence varying among countries, which probably relates to regions of conflict where rape may be common [14]. The degree of the problem is unclear as women with VVF who have experienced sexual violence often also have a significant obstetric history [15]. Nevertheless, it is important to elicit a history of sexual violence as these women will require different rehabilitation needs in the post-partum period.

Female genital mutilation is considered a cultural tradition necessary as part of raising a girl, to prepare her for adulthood and marriage and to ensure premarital virginity and marital fidelity [16]. It is nearly always carried out on minors and is internationally recognized as a violation of the human rights of girls and women. Its relationship to traumatic VVF is unclear, although nearly all forms of FGM will narrow the vaginal outlet during parturition (Table 1), which increases the risk of neo-natal death.

An analysis of population-based survey data from SSA found no impact of FGM on the incidence of VVF [8], although that analysis did not separate out the different types of FGM. Other smaller studies have, however, suggested a link with the most severe forms of FGM such as Type 3, infibulation, as well as Type 4, Gishiri cutting [17,18].

Non-fistulous urinary incontinence

Risk factors for the development of n-fUI in SSA are identical to those identified around the world, with significant independent risk factors recognized to be childbearing, constipation, obesity, chronic cough and ageing [6,19,20].

Childbearing is a well-established risk for UI due to a combination of mechanical damage to the pelvic floor musculature and connective tissue and nerve damage during pregnancy and labour [21]. Multiparous women have a higher risk of overall and stress UI compared with nulliparous women. Furthermore, prevalence is directly associated with parity number, with a reported odds ratio of 1.43 for women with a parity of 1, increasing to 1.58 with a parity of ≥ 3 [22]. SSA has the highest average fecundity in the world, with an average of 4.7 children per female life, which substantially increases the

Table 1 The WHO classification of female genital mutilation [16]

Type of FGM	Mutilation performed
Type 1	Partial or total removal of the clitoral glans and/or the prepuce/ clitoral hood
Type 2	Partial or total removal of the clitoral glans and the labia minora, with or without removal of the labia majora
Type 3	Infibulation. Narrowing the vaginal opening through the creation of a covering seal by cutting and repositioning the labia minora, or labia majora with or without removal of the clitoral prepuce/clitoral hood and glans.
Type 4	All other harmful procedures to the female genitalia for non-medical purposes, e.g., pricking, piercing, incising, scraping and cauterizing the genital area. Gishiri cutting is performed commonly by the peoples of the Hausa and Fulani regions of northern Nigeria and southern Niger. It consists of an incision of the posterior vagina into the perineum and is used by traditional healers to treat a range of gynaecological complaints.

importance of childbearing as a risk factor for the development of n-fUI [23]. The risk of n-fUI is still greatest with vaginal delivery and increased further by assisted, instrumental or forceps delivery [24,25] although it does still happen following Caesarean delivery. In SSA the prevalence of Caesarean section is low and shows significant geographical variation [26]. The reasons for this are multifactorial and may include difficulties with access due to long distances and poor transportation, a lack of availability of obstetric services and an insufficient availability of skilled staff, equipment and medicines. Gestational age has also been associated with an increased risk of UI. One study in Ethiopia found pregnant women who were in their second or third trimester were 9.6 times more likely to develop UI than in the first trimester [27]. Whilst this may be an overestimation due to the relatively low numbers in the study, other studies around the world do support increasing gestational age as a significant risk factor [28]. This is likely attributable to hormonal changes, increased uterine weight and weight gain leading to relaxation and reduced strength of pelvic floor muscles.

Non-fistulous urinary incontinence was found to be more common in cross-sectional studies from Nigeria, with adjusted odds ratios of 1.39 and 1.6 for overweight and obese women [29] and a twofold increased risk in patients who had a history of constipation [30]. Finally, studies in Ghana and Ethiopia have suggested up to four times increased risk of UI in women with a history of chronic cough [31,32]. Research has shown a growing burden of chronic respiratory disease in SSA [33] and this may become a more important factor for the development of female UI in the future.

Increasing age has also been demonstrated as an independent risk factor for n-fUI in SSA [32,34]. Several changes occur in older women that contribute to the increased risk including hypoestrogenism, decreased urethral closure pressure, decreased bladder sensation, development of detrusor overactivity and increased nocturnal urine production, in addition to changes that occur with the patient's functional status such as impaired mobility [35].

Implications of female incontinence

A community study in Ethiopia has explored the health and social problems encountered by women with obstetric fistula [36]. Although the numbers in the study were low ($n = 52$), it demonstrated a significant impact on mental health, with 92.3% having varying degrees of depression and 53.8% experiencing suicidal ideation. Furthermore, family life was significantly impacted, with 69.2% divorced and 19.2% not allowed to eat with family members, demonstrating the significant stigma associated with obstetric fistula [3]. It is difficult to assess the true impact of the stigma, and its impact on whether a woman seeks medical help. A meta-analysis of household survey data in SSA reported that

70.3% of women who had symptoms of VVF had sought treatment [14]. In those who had not, the common reasons given were cost (23.8%), not knowing where to find treatment (22.3%), not knowing the disorder was curable (21.1%) and feeling too embarrassed (10.9%). The impact on the ability of the woman with an untreated VVF to earn is substantially decreased, which is important in predominantly agrarian societies where women may be major contributors to the family's income [3]. Additionally, the fecundity of women with untreated or treated obstetric fistula is markedly decreased, either due to their incumbent social isolation in the untreated group or as a consequence of pelvic adhesions in the treated cohort [3].

We know from studies in high-income countries (HICs) that n-fUI has a significant detrimental impact on social life, personal relationships, mental health and sleep [37]. A review article exploring outcomes in LMICs found their quality of life to be even more drastically affected. n-fUI in these women was associated with difficulty in performing physical activities such as housework, limitations of social activities, leakage of urine during intercourse and feelings of isolation, shame, embarrassment, frustration, depression, annoyance and being dirty [38]. Islam is the second most commonly professed faith in SSA and Muslim women with n-fUI face specific problems that significantly impact their quality of life. One study found 90% of women reported the most distressing issue as an inability to pray and 65% reported low self-esteem due to feeling unclean because of their wetness [39].

Current Provision of Treatment

In the overstretched healthcare services of LMICs, provision of treatments for UI is generally low on the priority list. Treatment of patients with VVF is generally provided by local surgeons running camps funded by donor agencies or non-governmental organizations (NGOs), and the management of n-fUI is very variable. Approaches to the management of UI in Uganda and Malawi are used as exemplars of what is available across the LMICs in SSA.

Approach to Care for Women with Urinary Incontinence in Uganda and Malawi

Whereas some epidemiological studies show a prevalence of UI of 26.5% in women aged between 35 and 64 years, and 41% in those older than 65 years, in Uganda the prevalence of UUI and SUI is estimated at 27% [40]; however, this could be even higher since most women with incontinence do not present due to stigma. The majority of women who do present are of child-bearing age. Children, adolescents and those beyond 50 years only occasionally seek help.

Women with UI usually seek management from a urologist or urogynaecologist in a specialized hospital, while children

present to paediatric surgeons or urologists after referral from other health facilities. As most of these specialist facilities are in the capital cities of Uganda and Malawi, only a small percentage of the incident population are seen. The majority of women seek care through camps, organized and advertised by NGOs, to have assessment, treatment or surgery, when required, for their urinary and faecal incontinence.

Women with incontinence problems in Uganda predominantly present with CUI due to post-partum VVF or uretero-vaginal fistula after unsuccessful fistula repair or pelvic surgery or due to congenital problems, such as ectopic ureter or bladder exstrophy/epispadias complex. SUI, UUI, pelvic organ prolapse, cystocele or procidentia also present with urinary problems, but less frequently. One-year data from the fistula treatment centres in government hospitals at Mubende and Kagadi, non-governmental hospitals at Kuluva and Kamuli, and Kituti Health Centre in the Kyangwali refugee settlement, which organize fistula camps twice a year, are shown in Fig. 1.

Women who present with mild incontinence are taught pelvic floor exercises and followed up, whilst those presenting with overactive bladder, overflow incontinence and other causes of UI are given medications and, where necessary, catheterization. A team of counsellors are important to help these women overcome the stigma of their wetness and promote both adherence to treatments and health-seeking behaviour for the future.

Dealing with Obstetric Fistula

The high burden of obstetric fistula in Uganda demands two approaches to care. Static sites in the teaching hospitals of Mulago National Referral Hospital, in Kampala,

and the Mbarara University of Science and Technology, provide year-round care that is also available at non-governmental institutions. Women who cannot access care from the static sites often present to the 17–20 obstetric fistula camps that are held at a variety of venues, which improves the access available in rural communities. The donor agencies who support these camps in Uganda are shown in Table 2.

Ugandan fistula camps are supported by the Ugandan Ministry of Health (MOH), with some hospitals holding two to three camps each year, targeting 25–40 patients if funding allows. There are limited numbers of surgeons/gynaecologists trained to repair obstetric fistula with good outcomes, which compounds the incumbent problem.

Freedom from Fistula (FFF), a charity helping women and girls by providing free surgery to heal their fistulas and free maternity care to prevent fistulas and ensure safe childbirth, was formed in 2008 and expanded its services to Malawi in 2010 [41]. FFF then opened its own, stand-alone Fistula Care Centre (FCC) in the grounds of Bwaila Hospital in Lilongwe in 2012. A 35-bed unit with its own operating theatre has the capacity to treat more than 400 women every year. Patients frequently access the FCC through its ambassador and community programmes. Its holistic approach encompasses a patient rehabilitation, education and empowerment programme; this includes access to micro-finance, a solar project, literacy and numeracy classes, as well as lessons in arts and crafts.

Capacity Building

There is a need for more training in female urology, a neglected field in SSA, being a grey area between

Fig. 1 Uro-gynaecological conditions operated on for urinary incontinence in fistula outreach camps in selected hospitals in Uganda. EUA, examination under anaesthetic; VVF, vesico-vaginal fistula.

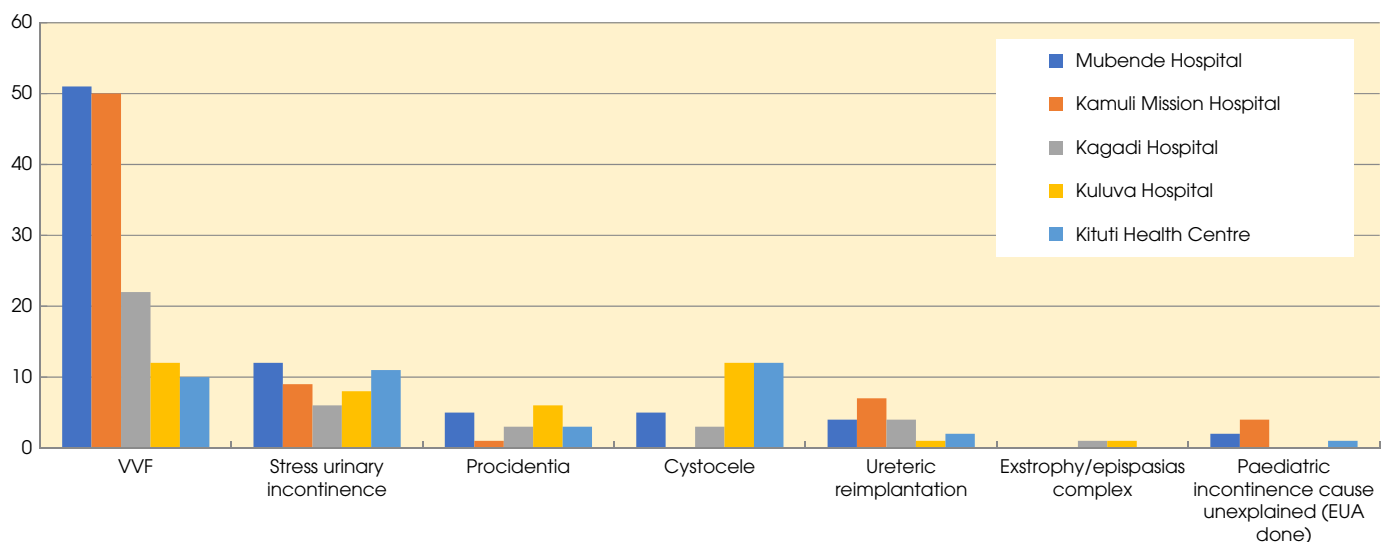


Table 2 Non-governmental organizations working in Uganda who help fund and provide obstetric fistula camps

Donor agency	Acronym	Link
United Nations Population Fund	UNFPA	https://www.unfpa.org
The Association for Rehabilitation and Re-Orienting of Women for Development	TERREWODE	https://terrewode.com
Uganda Childbirth Injury Fund	UCIF	https://www.ucif.co.uk
Medical Teams International		https://www.medicalteams.org
Fistula Foundation		https://fistulafoundation.org
AMREF Health Africa	AMREF	https://amref.org
Uganda Village Project		https://ugandavillageproject.org/fistula/

gynaecological and urological specialists, to create a pool of doctors who can comfortably diagnose and treat women with female urological problems. However, models to increase capacity by training non-physician clinical officers (COs) to perform repairs of simple VVFs have proven more successful due to the size of the problem [3,6] and the comparative paucity of the medical specialists available in most countries in SSA, according to the most recent data available (Table 3) [42].

In partnership with the United Nations Population Fund (UNFPA), Malawi has funded the training of COs and nurses from target districts to identify, screen and refer fistula patients. COs are trained for 3 years with the reproductive health branch of the Malawian MOH and dedicate 30% of their time to training to repair moderately complex cases in their home facilities. The training has a curriculum and is supported by didactic videos by expert fistula surgeons, textbooks and literature reading requirements, surgical instruction, and face-to-face evaluation and feedback. COs spend a total of 3 months at the FCC, where there is a high volume of cases and follow-up care. Nurses and anaesthetists from their hospital also attend training at the FCC. After evaluators agree that the CO is capable of safely performing simple obstetric fistula repairs and is able to determine which cases should be referred to the FCC

Table 3 Population density, number and density of surgeons and obstetricians per 100 000 population in Malawi, Uganda and the United Kingdom in 2015

Country	Population	Surgeons		Obstetricians and Gynaecologists	
		Total	Density	Total	Density
Malawi	15.9 × 10 ⁶	61	0.4	7	0
Uganda	36.3 × 10 ⁶	204	0.6	63	0.5
UK	62.8 × 10 ⁶	21 624	34.5	12 431	19.8

Extracted from Table S4. *Lancet Global Health*. 2015; 3: S9–11.

due to complexity, he/she is given approval to begin operating independently. They are mentored by the surgeons at the FCC so that a larger number of women are treated and more complex cases are healed at the first surgical attempt. COs are frequently allocated to rural hospitals where there are often few physicians practising clinically or available for supervision. The UNFPA supplies the hospital with instruments and the MOH keeps a record of where there is a trained CO able to operate, and supports them to continue training when there are opportunities. Mentoring continues with GOFAR, a programme provided by Operation Fistula to communicate with mentors at the FCC, and cases are entered into an electronic tablet so that key medical details can be visualized by the mentor; discussion of the case can then be facilitated and agreement on a care path made. This programme has allowed COs in key districts to perform simple fistula surgery, with more complex cases being referred on to the FCC in Lilongwe rather than a trial of surgery being performed for an inappropriate case in the rural area. Many COs are highly skilled clinical practitioners and, as their training is country-specific, there is less risk of them becoming part of the medical diaspora leaving for better-paid jobs elsewhere.

Ambassador Programmes

Women who develop obstetric fistula often live in rural, low-resource settings and lack access to obstetric care. After 4 years of establishing a national centre for women with obstetric fistula in Malawi, FFF sought innovative ways to assist women in accessing care when radio campaigns, word of mouth, health centres, and a telephone hotline had failed. As transportation is a major challenge, former patients were recruited to serve as ambassadors to raise awareness, find new patients, and assist patients in reaching the FCC.

Initially, 39 individuals were trained as ambassadors. The training included instructions on speaking to communities about preventing obstetric fistula by avoiding early marriage and going to the hospital for delivery. It also included raising awareness of obstetric fistula as a medical condition to decrease stigmatization. They learned from nurses how to identify patients based on symptoms and the history of the condition. Handbooks were used to show pictures for teaching groups. They were instructed to go to social gatherings, hospitals, and homes if appropriate. Pamphlets and posters were also given to distribute. They were given mobile phones for communicating with the centre and bicycles to help reach and transport patients. No other form of compensation was given and participants consented to take part in this programme voluntarily. The Malawian ambassador programme has been a huge success in the last few years, with more than 250 former patients or their family members acting as FFF ambassadors in their communities. Participants from rural areas were hesitant to travel somewhere they had never been due to fear or a lack of

transportation; ambassadors served as escorts to overcome these barriers to access. The pyramidal growth of the ambassador programme has ensured a significant increase in both the number of ambassadors and the number of patients with obstetric fistula seen and treated each year.

To help prevent fistulas from happening, FFF also funds access to maternal healthcare at two partner hospitals: Mtengowantenga Catholic Hospital and Achikondi Community Clinic. An average of 160 babies are safely delivered each month thanks to this financial support. Additionally, with funding from Rotary International, FFF supported the training of 60 Nurse Midwife Technicians in order to help build capacity in maternal healthcare in Malawi.

Urinary Incontinence and its Future in sub-Saharan Africa

Despite a good level of awareness about UI amongst the medical profession in SSA, that knowledge is not reflected in what women perceive to be the cause of their problems in the region. A community survey of 5001 Nigerian women were asked whether they were aware that women could experience UI, to which 39.1% responded yes [43]. These women were then asked what they believed the cause to be, with nearly half not responding or answering 'do not know'. In those women who listed causes, the most commonly cited were: pelvic floor- or bladder-related reasons (20.5%); uncontrollable factors (14.6%); medical comorbidities (9.2%); part of being female (8.8%); and pregnancy/childbirth (8.4%). Furthermore, in a community-based study in Ethiopia, 46.1% of women attributed the development of their obstetric fistula to evil spirits, curse or sin [38]. Some communities consider VVF as a punishment for immoral sexual behaviour or witchcraft [36]. This lack of awareness and stigma may in part be acting as a barrier for women with UI to seek medical advice and demonstrates a significant need for education of the aetiology of UI in SSA.

Despite there being the possibility of effective prevention of obstetric fistula by providing good obstetric care this is unlikely to occur in the short to medium term due to the huge disparity between LMICs and HICs in the availability of medical specialists. Although the NGO camps do provide effective surgery for obstetric fistula, the number of women treated is a small proportion of the numbers who have obstetric fistula and, particularly n-fUI, in many communities. The stigma associated with incontinence, and an ignorance of the available treatments allied to this lack of capacity, means there is a large unmet need for fistula management, and a largely unidentified need for the management of other forms of female incontinence in SSA.

Both pelvic floor fistula causing UI and the occurrence of n-fUI are a significant burden to women in SSA, who

experience physical, social and mental complications as a result. There is a need to educate women and their communities about the aetiology and management of UI in order to reduce the associated stigma and encourage women to seek treatment which has been shown to be hugely effective for both pelvic floor fistula and n-fUI [3,44].

Disclosure of Interests

The authors declare no conflicts of interest.

References

- 1 Irwin DE, Kopp ZS, Agatep B, Milsom I, Abrams P. Worldwide prevalence estimates of lower urinary tract symptoms, overactive bladder, urinary incontinence and bladder outlet obstruction. *BJU Int* 2011; 108: 1132–8.
- 2 Tayler-Smith K, Zachariah R, Manzi M et al. Obstetric Fistula in Burundi: a comprehensive approach to managing women with this neglected disease. *BMC Pregnancy Childbirth* 2013; 13: 1–8.
- 3 Polan ML, Sleemi A, Bedane MM et al. Obstetric fistula. In Debas HT, Donkor P, Gawande A eds, et al. editors. *Disease Control Priorities, (Volume 1): Essential Surgery 3rd Edition*. Washington, DC: World Bank Publications, 2015.
- 4 ICS. Continuous urinary incontinence. <https://www.ics.org/committees/standardisation/terminologydiscussions/continuousurinaryincontinence> Accessed July 2022
- 5 ICS. Stress urinary incontinence. <https://www.ics.org/committees/standardisation/terminologydiscussions/sui> Accessed July 2022
- 6 Ackah M, Ameyaw L, Salifu MG et al. Estimated burden, and associated factors of urinary incontinence among Sub-Saharan African women aged 15–100 years: A systematic review and meta-analysis. *PLOS. Glob Public Health* 2022; 2. <https://doi.org/10.1371/journal.pgph.0000562>.
- 7 Mostafaei H, Sadeghi-Bazargani H, Hajebrahimi S et al. Prevalence of female urinary incontinence in the developing world: a systematic review and meta-analysis – a report from the developing world committee of the international continence society and Iranian research centre for evidence based medicine. *Neurourol Urodyn* 2020; 39: 1063–86.
- 8 Maheu-Giroux M, Filippi V, Maulet N et al. Risk factors for vaginal fistula symptoms in Sub-Saharan Africa: a pooled analysis of national household survey data. *BMC Pregnancy Childbirth* 2016; 16: 82.
- 9 Laborda E, Rienhardt G, Anthony F et al. Why do black African women have a reduced incidence of stress incontinence compared to white women? *IUJ* 2005; 16: S127.
- 10 ICS. Urgency urinary incontinence. <https://www.ics.org/glossary/sign/urgencyurinaryincontinence> Accessed July 2022
- 11 ICS. Female Mixed urinary incontinence. <https://www.ics.org/committees/standardisation/terminologydiscussions/femalemixedurinaryincontinencemui> Accessed July 2022
- 12 Hilton P. Vesico-vaginal fistulas in developing countries. *Int J Gynaecol Obstet* 2003; 82: 285–95.
- 13 Ayenew AA. Incidence, causes, and maternofetal outcomes of obstructed labor in Ethiopia: systematic review and meta-analysis. *Reprod Health* 2021; 18: 1–4.
- 14 Maheu-Giroux M, Filippi V, Samadoulougou S et al. Prevalence of symptoms of vaginal fistula in 19 sub-Saharan Africa countries: a meta-analysis of national household survey data. *Lancet Glob Health* 2015; 3: e271–8.
- 15 Onsrud M, Sjoveian S, Luhiriri R, Mukwege D. Sexual violence-related fistulas in the Democratic Republic of Congo. *Int J Gynaecol Obstet* 2008 Dec; 103: 265–9.

- 16 WHO. Female genital mutilation. <https://www.who.int/news-room/fact-sheets/detail/female-genital-mutilation> Accessed July 2022
- 17 Tukur J, Jido TA, Uzoho CC. The contribution of gishiri cut to vesicovaginal fistula in Birkinin Kudu, northern Nigeria. *Afr J Urol* 2006; 12: 121–5.
- 18 Matanda DJ, Sripad P, Ndwiga C. Is there a relationship between female genital mutilation/cutting and fistula? A statistical analysis using cross-sectional data from Demographic and Health Surveys in 10 sub-Saharan Africa countries. *BMJ Open* 2019; 9: e025355.
- 19 Minassian VA, Drutz HP, Al-Badr A. Urinary incontinence as a worldwide problem. *Int J Gynaecol Obstet* 2003; 82: 327–38.
- 20 Subak LL, Richter HE, Hunnskaar S. Obesity and urinary incontinence: epidemiology and clinical research update. *J Urol* 2009; 182(6 Suppl): S2–7.
- 21 Wood LN, Anger JT. Urinary incontinence in women. *BMJ* 2014; 349: g4531.
- 22 Zhou H, Shu B, Liu T, Wang X, Yang Z, Guo Y. Association between parity and the risk for urinary incontinence in women. *Medicine (Baltimore)* 2018; 97: e11443.
- 23 Bongaarts J. Trends in fertility and fertility preferences in sub-Saharan Africa: the roles of education and family planning programs. *Genus* 2020; 76: 1–5.
- 24 Rortveit G, Daltveit AK, Hannestad Y et al. Urinary Incontinence after vaginal delivery or caesarean section. *N Engl J Med* 2003; 348: 900–7.
- 25 Ojengbade OA, Adedokun BO, Morhason-Bello IO, Kolade CO, Okonkwo NS. Childbirth method has an effect on non-fistulous urinary incontinence amongst sub-Saharan African women: fact or fallacy? *Int Urogynecol J* 2010; 21: 1391–5.
- 26 Yaya S, Uthman OA, Amouzou A, Bishwajit G. Disparities in caesarean section prevalence and determinants across sub-Saharan Africa countries. *Glob Health Res Policy* 2018; 3: 1–9.
- 27 Berhe A, Alamer A, Negash K, Assefa B. Urinary incontinence and associated factors among pregnant women attending antenatal care in public health facilities of Mekelle city, Tigray, Ethiopia. *Womens Health (Lond)* 2020; 16: 1745506520952009.
- 28 Sangsawang B, Sangsawang N. Stress urinary incontinence in pregnant women: a review of prevalence, pathophysiology and treatment. *Int Urogynecol J* 2013; 24: 901–12.
- 29 Okunola TO, Olubiyi OA, Omoya S, Rosiji B, Ajenifuja KO. Prevalence and risk factors for urinary incontinence in pregnancy in Ikere-Ekiti. *Nigeria NeuroUrol Urodyn* 2018; 37: 2710–6.
- 30 Akinlusi FM, Ottun TA, Oshodi YA, Seriki BO, Olalere FDH, Kuye TO. Female Urinary Incontinence: Prevalence, risk factors and impact on the quality of life of gynecological clinic attendees in Lagos. *Nigeria Nep J Obstet Gynecol* 2020; 15: 31–8.
- 31 Bekele A, Adefris M, Demeke S. Urinary incontinence among pregnant women, following antenatal care at University of Gondar Hospital. *North West Ethiopia BMC Pregnancy Childbirth* 2016; 16: 1–6.
- 32 Ofori AA, Osarfo J, Agbeno EK, Azanu WK, Opare-Addo HS. Prevalence and determinants of non-fistulous urinary incontinence among Ghanaian women seeking gynaecologic care at a teaching hospital. *PLoS One* 2020; 15: e0237518.
- 33 Gouda HN, Charlson F, Sorsdahl K et al. Burden of non-communicable diseases in sub-Saharan Africa, 1990-2017: results from the Global Burden of Disease Study 2017. *Lancet Glob Health* 2019; 7: e1375–87.
- 34 Njoku CO, Njoku AN, Emechebe CI, Okpe AE, Iklaki CI. Pattern and risk factors of non-fistulous urinary incontinence among gynaecological clinic attendees in a Nigeria tertiary health institution. *Int J Reprod Contracept Obstet Gynecol* 2020; 9: 2323–7.
- 35 Gomelsky A, Dmochowski RR. Urinary incontinence in the aging female: etiology, pathophysiology and treatment options. *Aging Health* 2011; 7: 79–88.
- 36 Muleta M, Hamlin EC, Fantahun M, Kennedy RC, Tafesse B. Health and social problems encountered by treated and untreated obstetric fistula patients in rural Ethiopia. *J Obstet Gynaecol Can* 2008; 30: 44–50.
- 37 Abrams P, Smith AP, Cotterill N. The impact of urinary incontinence on health-related quality of life (HRQoL) in a real-world population of women aged 45-60 years: results from a survey in France, Germany, the UK and the USA. *BJU Int* 2015; 115: 143–52.
- 38 Walker GJA, Gunasekera P. Pelvic organ prolapse and incontinence in developing countries: review of prevalence and risk factors. *Int Urogynecol J* 2011; 22: 127–35.
- 39 El-Azab AS, Mohamed EM, Sabra HI. The prevalence and risk factors of urinary incontinence and its influence on the quality of life among Egyptian Women. *NeuroUrolUrodyn* 2007; 26: 783–8.
- 40 Mutungi T, Spitzer R, Origa M, Kayondo M, Kyakuhaire M, Nyiramugisha J. Prevalence of urogynaecology symptoms in a rural population in western-Uganda. *J Obstet Gynaecol Can* 2019; 41: 727.
- 41 Freedom from fistula. <https://www.freedomfromfistula.org.uk> Accessed September 2022
- 42 Holmer H, Lantz A, Kunjumen T et al. Global distribution of surgeons, anaesthesiologists, and obstetricians. *Lancet Glob Health* 2015; 3: S9–11.
- 43 Morhason-Bello IO, Ojengbade OA, Adedokun BO. Theories of urinary incontinence causation: aetiological descriptions by sub-Saharan African women. *Eur J Obstet Gynecol Reprod Biol* 2012; 162: 109–12.
- 44 Imamura M, Hudson J, Wallace SA et al. Surgical interventions for women with stress urinary incontinence: systematic review and network meta-analysis of randomised controlled trials. *BMJ* 2019; 365: 11842.

Correspondence: Danielle Whiting, Department of Urology, Freeman Hospital, Newcastle-upon-Tyne, UK.

e-mail: danielle.whiting@doctors.org.uk

Abbreviations: CO, non-physician clinical officer; CUI, continuous urinary incontinence; FCC, fistula care centre; FFF, Freedom From Fistula; FGM, female genital mutilation; HIC, high-income country; LMIC, low- or lower-middle-income country; MUI, mixed urinary incontinence; n-fUI, non-fistulous UI; NGO, non-governmental organization; SSA, sub-Saharan Africa; SUI, stress urinary incontinence; UI, urinary incontinence; UNFPA, United Nations Population Fund; UUI, urgency urinary incontinence; VVF, vesicovaginal fistula.