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Frequency and management of non-obstetric fistula in the Democratic Republic of Congo: experience from the Fistula Care *Plus* project

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Abstract

OBJECTIVE To describe the frequency, causes and post-repair outcomes of NOF in hospitals supported by the Fistula Care Plus (FC+) project in the Democratic Republic of Congo.
METHODS Retrospective cohort study from 1 January 2015 to 31 December 2017 in three FC + supported fistula repair sites.
RESULTS Of 1984 women treated for female genital fistula between 2015 and 2017 in the three FC + supported hospitals, 384 (19%) were considered to be non-obstetric fistula (NOF) cases. 49.3% were married/in a relationship at the time of treatment *vs*. 69% before the fistula, $P < 0.001$. Type III ($n = 247$; 64.3%) and type I ($n = 121$; 31.5%) fistulas according to Kees/Waaldijk classification were the most common. The main causes of NOF were medical procedure ($n = 305$; 79.4%); of these, caesarean section ($n = 234$; 76.7%) and hysterectomy ($n = 54$; 17.7%) were the most common. At hospital discharge, the fistula was closed and dry in 353 women (95.7%).
CONCLUSION Non-obstetric fistula, particularly due to iatrogenic causes, was relatively common in the DRC, calling for more prevention that includes improved quality of care in maternal health services.

keywords non-obstetric fistula, frequency, management, cohort, Democratic Republic of Congo

Introduction

Non-obstetric fistula (NOF) is defined as any female genital fistula that is traumatic (including trauma from pelvic crush or impalement injuries or sexual assault-related puncture injuries); iatrogenic (caused by medical procedure); congenital; or caused by tumour, infections, inflammatory disease, end-stage eroding cancers [1]. As compared to obstetric fistula, which is more frequent and mostly caused by obstructed labour, NOF has seldom been the subject of scientific publications [2]. Yet, it affects and impacts the life of many women in developing countries [3-5].

A recent review by Hilton indicates that 11% of vaginal fistula reported from developing countries are iatrogenic. A retrospective study of women receiving fistula repair between 1992 and 2012 in 11 Asian and African countries reports 13.2% of iatrogenic vaginal fistula cases [2,5]. All these studies identified caesarean section and hysterectomy as main causes of iatrogenic fistula [3,4].

Increasing incidence of NOF has been reported. A study in Syria including data from 42 years (1964–2005) shows that the aetiology of urinary fistula has changed over the study period, with 90.5% having obstetric causes during the first phase of the study (1964–1979) *vs*. 43% during the third phase (1998–2005) [6]. More recently, Wright et al reported an increase in the proportion of iatrogenic fistula from 26.9% in 2011 to 36.2% in 2015 in Ethiopia [7].

It is plausible that NOF occurs more frequently in conflict zones where sexual violence is common [8]. NOF may also be common in settings where minimum standards for safe surgery are not met, for instance due to resource constraints on surgical equipment and supplies, unreliable facility resources for water and power, and too few and sufficiently experienced obstetric staff [9]. In

such settings, staff may cause fistula during obstetric or gynaecologic surgery [5].

In the Democratic Republic of Congo (DRC), urogenital fistula remains frequent in a context where access to skilled obstetric staff is scarce and where internal and neighbouring conflicts have fostered sexual violence by armed groups, leading to more traumatic (sexual) fistulas [8]. Onsrud et al recorded 24% of iatrogenic fistula among women with fistula at Panzi Hospital in Bukavu between 2005 and 2007 [9]. Another study conducted in the same population reported 4% of fistula caused by sexual violence [8]. According to routine data from the USAID-supported Fistula Care *Plus* project implemented by EngenderHealth, 8% of the 566 fistula cases repaired between January 2013 and March 2015 at Saint Joseph Hospital of Kinshasa were of iatrogenic origin, caused by caesarean section and hysterectomy [10]. Relevant information provided by different studies in DRC reveals the following similarities: (i) they often present partial patient history information on NOF; (ii) original studies are conducted in single sites that do not allow generalisation to national or regional levels; and (iii) the studies do not report on post-repair outcomes of NOF.

Understanding the frequency, the causes and the treatment outcomes of NOF would help to better inform interventions for prevention and management of urogenital fistula, particularly within populations at risk. Thus, the aim of this study was to fill these gaps by describing the frequency, causes and post-repair outcomes of NOF in hospitals supported by the Fistula Care *Plus* project in DRC.

Methodology

Study design

This was a retrospective cohort study using data extracted from medical records of patients treated for NOF in three hospitals supported by the Fistula Care Plus Project.

Study setting

DRC is located in central Africa, with 2 325 409 square kilometres and a population of 77 million of which nearly 60% live in rural settings [11]. The country has a maternal mortality ratio of 693 deaths per 100 000 live births (95% CI: 509–1010) [12]. The national health system is decentralised with 515 health zones in 26 provinces and funded by public and private mechanisms [12]. An estimated 40 000 women suffer from genital fistula in DRC [13].

Between 2008 and 2012, EngenderHealth, a US-based NGO, supported repair of 6490 cases of female genital fistulas in DRC, through the USAID-supported Fistula Care project [14]. Since 2013, Fistula Care *Plus*, the follow-on project, has supported more than 600 repairs in five sites as of December 2017. The present study was conducted in three of these sites (Saint Joseph Hospital of Kinshasa, Heal Africa Hospital of Goma and the general reference hospital of Panzi). The three sites manage fistula cases through routine and outreach surgical sessions. They were selected based on the number of repairs conducted and the availability of medical records.

Study population

We included all women treated for NOF in the selected sites between 1 January 2015 and 31 December 2017.

Variables, source and data collection

The study variables included the sociodemographic characteristics (age, province of origin, place of residence, education level and marital status) and obstetric and clinical characteristics (gravidity, parity, weight, height, number of previous repairs, fistula type (according to Waaldijk's classification), presence of fibrosis, fistula size, status of the urethra, duration of urine leakage, duration of urinary catheter and urethral catheter after repair, post-surgery complications). We also examined fistula causes and the outcome of the surgical repair (closed and dry fistula, closed fistula with residual incontinence, unclosed fistula). Waaldijk's classification categorises urogenital fistulas into three types: type I comprises fistulas not involving urethral closure mechanism; type II comprises fistula involving urethral closure mechanism; and type III are fistulas involving urethra and other exceptional fistulas. Type II can be further categorised into type IIA (without total involvement of urethra), type IIB (with total implication of urethra), type IIA (without circumferential defect) and type IIB (with circumferential defect) [15].

Data were collected from 1 August 2017 to 28 February 2018 using a standardised questionnaire. To harmonise concepts' definitions across the study sites and train investigators, a workshop on the study protocol was held from 5 to 11 July 2017 in Kinshasa, DRC.

Data management and analysis

Data collected from patients' medical records were double-entered by two encoders at each participating site using EpiData software (version 3.1; EpiData

Association, Odense, Denmark). The two data sets were compared and reconciled into one data set by a supervisor who generated queries that were addressed by study sites. Because this study was conducted as part of a capacity-building project, a data analysis workshop was conducted with the sites from 28 May to 1 June 2018 in Goma, DRC. Data analysis was done using Stata 13 software (Stata Corporation, College Station, TX, USA). Data were presented as percentages.

Ethical approval

The study protocol was approved by the Ethics Committee of the School of Public Health of the University of Kinshasa.

Results

Frequency of NOF

Of 1984 patients who received female urogenital fistula repair during the study period in the three sites, 384 (19%) had NOF (Figure 1).

Sociodemographic characteristics of patients

The majority (60.4%) of patients repaired for NOF in the study sites were 25–49 years old, with a mean age of 29.1 years (standard deviation (SD): 15.5 years) (Table 1). They mainly resided in rural settings (91%), had no formal education (49%) and were farmers (32.6%) or housewives (22.9%). Of those receiving repair, 49% were married or in union at the time of repair, *vs*. 69% before the fistula occurrence.

Obstetric and clinical characteristics of patients

Of 36.7% of patients had had 5 or more pregnancies, and 31.5% had had 2 to 4 pregnancies. The majority were multiparous (2 to 4 childbirths; 33.3%) or grand multiparous (5 childbirths or more; 32.6%) (Table 2). The mean duration of urine leakage in patients was 42.9 months (SD: 80.7). Most patients (82.3%) had had no previous repair. Fistula size was less than 1.5 cm in the majority of cases (56.5%). The urethra was intact in 96.2% of cases; however, patients with fibrosis comprised 57.3%. According to Waaldijk's classification, fistula types included type III (64.3%), type I (31.5%), type IIa (1.8%) and type IIb (1.6%).

The mean duration of urethral catheterisation after fistula repair was 10.7 days (SD: 6.9). Post-surgery complications occurred in 7.9%.

Causes of NOF

Medical procedure constituted the main cause of NOF cases (79%) in the study sites. Other causes were congenital malformation (11%), sexual assault (7%) and tumour (3%) (Figure 2a). Caesarean section was the commonest cause among medical procedures (77%), followed by hysterectomy (18%) (Figure 2b). Most of these medical procedures occurred at a health facility (94%) (Figure 2c).

Post-repair outcomes of NOF

Overall, 369 patients received surgical repair (Figure 1). Nearly, all patients had closed fistula and were dry (continent) after removal of the bladder catheter (96.8%). At hospital discharge, 95.4% were documented as closed and dry after fistula surgery, with complications reported in 7.9% of cases (Table 2).

Discussion

This study is the first to examine NOF in DRC comprehensively across multiple fistula repair facilities. It showed that NOF is relatively frequent and often of iatrogenic origin. Hospitals supported by the Fistula Care *Plus* project generally achieved good short-term surgical outcomes. Findings from this study provide important baseline information for fistula prevention in DRC and other countries with similar contexts. The findings might also guide health policies and practices to prevent and manage NOF in developing countries.

Limitations and strengths

This study has certain limitations. First, its retrospective design did not allow access to information on aetiology for all fistula cases admitted in the study sites. This might have led to under-classification of NOF cases. Second, the lack of consensus on the definition of iatrogenic fistula might result in variation of how cases are classified by surgeons in the three repair sites. Third, this report does not include information on post-discharge outcomes and long-term fistula recurrence [16]. Finally, our data, even though providing some indications about the NOF trends at the country level, cannot be considered representative of the entire DRC.

Despite these limitations, the study findings are strengthened by the relatively large sample size, enabled by the use of three years of clinical data. Eliciting appropriate and valid information about NOF from the available data was enabled by the continuous involvement of

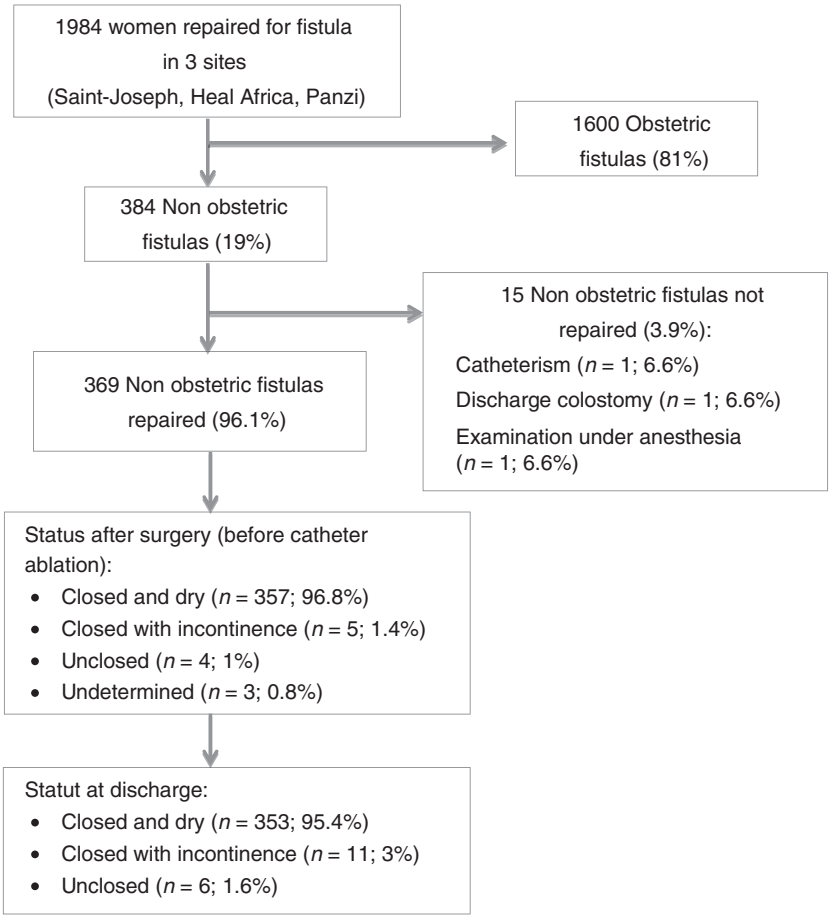

Figure 1 Flow chart of inclusions and outcomes post-repair of non-obstetric fistula cases treated in three hospitals supported by the Fistula Care *Plus* project, Democratic Republic of Congo, 2015–2017.

treatment site personnel in both design and implementation of the study.

The proportion of NOF reported in this study among female genital fistula cases (19%) highlights the need for more attention to this type of fistula, particularly in sub-Saharan Africa. This study's findings align with the increasing trend of iatrogenic fistulas recently reported in sub-Saharan Africa, along with a call to action to improve surgical practices during obstetric care [2,7,16,17]. A meeting of fistula experts in September 2015 in Addis Ababa called upon scientists, political decision-makers and funding agencies to pay more attention to and take more action for the prevention and management of fistula caused by sexual violence in Africa [18].

Our study showed that nearly four in five NOF cases admitted for repair are caused by surgical interventions mostly undertaken in health facilities. However, 6% of major surgeries related to NOF were not done in a facility, which is concerning especially if extrapolated to country scale. Caesarean section was the main operation causing iatrogenic NOF, followed by hysterectomy. Recent studies have reported the same causes in developing countries [5,7,17]. Yet, with the advent of anaesthesia and safe and effective medical procedures, occurrence of urogenital fistula has become a rare event in developed countries [19]. This calls for action improvements of obstetric practices and supporting a minimum standard of surgical care in developing countries where major obstetric emergencies are common [20]. Indeed, the quality of obstetric emergency management remains challenging in these areas because of insufficient trained staff, and the absence of regulatory norms of health sector governance in a context of caesarean section capacity-building without concurrent, mandatory systems-based quality

Table 1 Sociodemographic characteristics of patients repaired for non-obstetric fistula in three hospitals supported by the Fistula Care *Plus* project, Democratic Republic of Congo, 2015–2017

Variables	Number	*n* = 384 Proportion (%) or Mean (SD)
Age (year)		
<15	68	17.7
15–24	48	12.5
25–49	232	60.4
≥50	36	9.4
Mean	384	29.1 ± 15.5
Place of residence		
Rural	349	91
Urban	35	9
Education level		
None	188	49
Primary	105	27
Secondary or professional	59	15
Higher	7	2
Not provided/undetermined	25	7
Marital status before the fistula		
Married/in union	264	69
Single	31	8
Widow	7	2
Divorced/separated	13	3
Not applicable	60	16
Not provided/undetermined	8	2
Current marital status		
Married/in union	189	49
Single	30	7.8
Widow	19	5
Divorced/separated	77	20.1
Not applicable	60	16
Not provided/undetermined	8	2.1
Occupation		
Farmer	125	32.6
Housewife	88	22.9
Other†	41	10.7
Not provided/undetermined	130	33.8

SD, standard deviation.
†Trader, workwoman, employed, student.

assurance at the facility level. Unreliable supply of surgical supplies and lack of procurement and maintenance of surgical equipment within health facilities contribute further challenges to providing safe surgical care. Finally, challenges related to accessibility and affordability of surgical care lead to delays in care-seeking long after entering a phase of prolonged and obstructed labour lasting 2 or more days, a situation that is far too common across Africa.

To prevent iatrogenic fistulas in developing countries, Hilton recommends that governments and education

Table 2 Obstetric and clinical characteristics of patients repaired for non-obstetric fistula in three hospitals supported by the Fistula Care *Plus* project, Democratic Republic of Congo, 2015–2017

Variables	Number	*n* = 384 Proportion (%) or Mean ± SD
Weight (kg)	384	44.8 ± 17.7
Height (cm)	383	139.3 ± 34.4
Gestity		
0	71	18.5
1	51	13.3
2–4	121	31.5
≥5	141	36.7
Parity		
Nulliparous†	71	18.5
Primiparous‡	60	15.6
Multiparous§	128	33.3
Grand multiparous¶	125	32.6
Duration of urine leakage (month)	377	42.9 ± 80.7
Number of previous repair		
0	316	82.3
1–2	63	16.4
≥3	5	1.3
Type of fistula (*n* = 381)		
Type I	121	31.8
Type IIa	7	1.8
Type IIb	6	1.6
Type III	247	64.8
Vesicouterine	*95*	*38.5*
Urethrovaginal	*81*	*32.8*
Rectovaginal	*62*	*25.1*
Other††	*9*	*3.6*
Existence of fibrosis (*n* = 370)		
Yes	212	57.3
Fistula size (cm) (*n* = 370)		
<1.5	209	56.5
1.5–3	103	27.8
>3	58	15.7
Status of the urethra (*n* = 370)		
Intact	356	96.2
Partially damaged	9	2.4
Complete destruction	5	1.4
Duration of urinary catheter (days)	370	10.7 ± 6.9
Duration of ureteral catheter (in hours)	370	3.8 ± 4.4
Post-surgery complications (*n* = 369)		
Yes	29	7.9

SD, standard deviation.
†No history of childbirth.
‡Has had 1 childbirth.
§Has had 2 to 4 childbirths.
¶Has had 5 childbirths or more.
††Vesicocutaneous, ureterocutaneous.

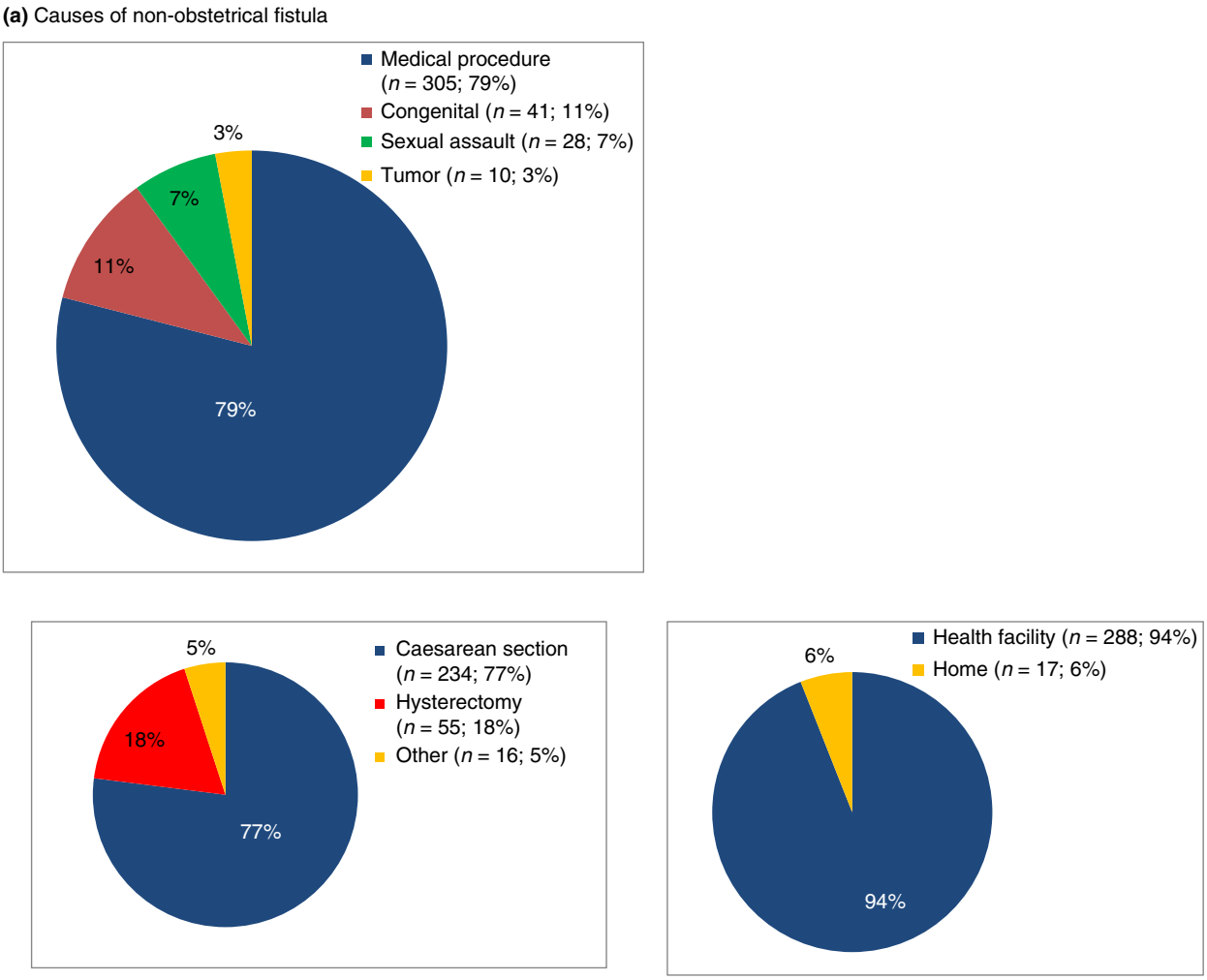

Figure 2 Causes of non-obstetric fistula among patients treated in three hospitals supported by the Fistula Care *Plus* project, Democratic Republic of Congo, 2015–2017.

authorities commit to training and planning of medical workforce, and to facilitating audits and operational research, in order to maintain competent and supervised care providers in appropriate working environments [2]. The Fistula Care *Plus* project and Maternal Health Task Force convened a technical consultation in July 2017 to examine the challenges affecting safety and quality of caesarean section in sub-Saharan Africa [21]. Participants recommended establishment of criteria and accreditation processes for facilities performing caesarean section, and supervision and training of staff in surgery, anaesthesia and obstetrics [21]. These recommendations imply the need for improved policies and practices in surgery and gynaecology–obstetrics as a key component for prevention of fistula, particularly NOF, in sub-Saharan Africa. The Lancet Commission on Global Surgery (LCoGS), in a joint meetings held in 2014 in Boston (USA), Freetown (Sierra Leone) and Dubai (The United Arab Emirates), emphasised the fact that surgery services constitute a prerequisite for full achievement of maternal and reproductive health goals locally and globally [22].

In our study, 7% of NOF was caused by sexual violence. Longombe et al reported 14.8% of fistula cases as caused by sexual violence among 4715 women and girls in Eastern Congo between 2003 and June 2006 [22]. However, Onsrud et al found a smaller proportion of cases to be directly caused by sexual violence [8]. It is difficult to know whether the proportion found in our study is representative of that in the population. In fact, in conflict or post-conflict context like in DRC, most

victims of sexual assault-generated fistulas refrain from disclosing their situation fearing other assaults and stigmatisation, or are unaware, or simply ignore the existence of fistula repair services [23]. Fistula prevention efforts in sub-Saharan Africa traditionally focus on the fight against early marriage, birth attendance by non-skilled attendants and improvement of timely access to obstetric care [24]. However, addressing intimate partner sexual violence and protecting women in conflict areas against violence should be an important focus of female genital fistula prevention.

Almost all patients who underwent repair for NOF in the study sites (95.4%) had good surgical outcomes and experienced very few complications. Wright et al in Ethiopia and Sanda et al in Niger also reported high rates of good surgical outcomes among women presenting with iatrogenic fistula [7,25]. Our findings reflect good quality of care in the study sites. The facilities included in this report have been supported by EngenderHealth fistula projects for both training and equipment since 2008, which may have contributed to the presence of competent staff and an improved platform of care. Tayler-Smith et al have reported that it was feasible to implement a comprehensive package of fistula management in a rural setting in Africa and to achieve good outcomes post-repair [26].

Conclusion

NOF is relatively frequent in DRC and is predominantly of iatrogenic origin, mostly due to caesarean section and hysterectomy. Efforts to improve surgical and gynaecology–obstetrics policies and practices and to prevent sexual violence would contribute to preventing NOF in DRC.

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