

# Retrospective Review of Predisposing Factors and Surgical Outcomes in Obstetric Fistula Patients at a Single Teaching Hospital in Western Kenya

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## Abstract

**Objective:** We examined success rates and complications of obstetric fistula (OF) surgical repairs in association with patient and fistula characteristics, including sociocultural and socioeconomic determinants of health. A better understanding of these associations will help guide surgical management and prevent predisposing factors.

**Methods:** We reviewed the medical records of 86 patients who underwent OF repair at Moi Teaching and Referral Hospital in Kenya between 1999 and 2007.

**Results:** Women with OF presented for repair with a variety of concurrent conditions. Seventy-eight percent had laboured for at least 24 hours; 29% had undergone previous unsuccessful surgery. Of the women who presented at postoperative follow-up, 54% still complained of incontinence. Persistent incontinence was associated with larger, more complicated fistulas and having had previous failed attempts at surgical repair.

**Conclusion:** The association of factors such as duration of labour with OF reflects the limited availability of obstetrical care in Western Kenya. There is a significant difference in postoperative success of fistula repair between women with large fistulas or those who had previous failed surgery and other patients. This reflects the importance of primary and secondary prevention.

**Key Words:** Obstetric fistula, Kenya, retrospective review, predisposing factors, surgical outcomes

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## Résumé

**Objectif :** Nous avons examiné les taux de réussite et les complications des chirurgies de réparation de fistule obstétricale (FO), en association avec les caractéristiques des patientes et des fistules en question, y compris les déterminants socioculturels et socioéconomiques de la santé. Une meilleure compréhension de ces associations contribuera à orienter la prise en charge chirurgicale et à prévenir les facteurs prédisposants.

**Méthodes :** Nous avons analysé les dossiers médicaux de 86 patientes qui ont subi des réparations de FO au *Moi Teaching and Referral Hospital* au Kenya entre 1999 et 2007.

**Résultats :** Les femmes présentant une FO souhaitaient obtenir une réparation en raison de diverses pathologies concomitantes. Soixante-dix-huit pour cent d'entre elles avaient connu un travail d'une durée d'au moins 24 heures; 29 % avaient déjà subi une chirurgie s'étant soldée en échec. Chez les femmes qui ont participé à un suivi postopératoire, 54 % connaissaient toujours une incontinence. L'incontinence persistante a été associée à des fistules plus importantes et compliquées, ainsi qu'au fait d'avoir déjà subi des tentatives de réparation chirurgicale s'étant soldées en échecs.

**Conclusion :** L'association de facteurs tels que la durée du travail avec la FO reflète la disponibilité limitée des soins obstétricaux dans l'ouest du Kenya. Il existe une différence significative en matière de réussite postopératoire de la réparation de fistule entre les femmes qui présentent de larges fistules ou qui ont déjà subi une chirurgie s'étant soldée en échec et les autres patientes. Cela souligne l'importance de la prévention primaire et secondaire.

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## **INTRODUCTION**

Obstetric fistula has been cited as one of the most dramatic and physically, psychologically, and socially damaging, yet preventable, complications of labour.<sup>1</sup> In the context of resource-poor settings where access to emergency obstetrical care is often limited, OF usually occurs as a result of prolonged obstructed labour. It is formed most commonly between the bladder and vagina (vesicovaginal fistula), the rectum and vagina (rectovaginal fistula), or both. The physical symptoms of such fistulas include incontinence of urine and/or stool, frequent bladder infections, ammoniacal dermatitis, amenorrhoea, infertility, and foul odour.<sup>2</sup> Women with OF also face other significant physical and social challenges, including infertility, social isolation, and unemployment.<sup>3</sup>

Accurate estimation of the burden of disease associated with OF is difficult to measure; however, it is undeniably significant. The 1990 Global Burden of Disease report on OF makes a reasonable estimate of the prevalence at 654 000 women worldwide.<sup>4</sup> The WHO estimates that more than two million women currently live with OF globally, with 50 000 to 100 000 women newly affected every year.<sup>5</sup> In the rural Kenyan region of West Pokot, from which most of the women presenting to Moi Teaching and Referral Hospital with OF originate, it is estimated that 1 in 1000 women suffer from OF.<sup>2</sup> Given that these numbers are derived from records of women who present for hospital-based treatment, they likely underestimate true prevalence rates.

Despite the high prevalence of OF, the international capacity to treat fistula remains at only 6500 surgeries per year.<sup>6</sup> Surgery is the only definitive treatment for OF, and its success is reported to be as high as 85% to 95% with the first surgical attempt.<sup>2</sup> However, the surgery is often delayed because of lack of transportation and access to health care, and can result in significant postoperative complications.<sup>7</sup> While efforts are being made to improve access and success rates of surgery, it is imperative to address the burden of OF through primary prevention.<sup>8</sup>

Because of the difficulties in conducting large studies on OF, knowledge about OF in rural Kenya is primarily based on anecdote. Factors precipitating OF, such as childbearing

at a young age, lack of skilled birth attendants, and long distances to health care facilities, were identified in a needs assessment published in 2004.<sup>9</sup> To date, there have been no data published on the surgical outcomes of OF patients in rural Kenya. Therefore, this study sought to contribute to knowledge about OF in Kenya and, more specifically, to examine the success rates and complications of OF repair in association with sociocultural and socioeconomic determinants of health. A better understanding of these associations would inform the surgical management of OF and encourage the prevention of predisposing factors. An understanding of comorbid conditions and postoperative complications associated with OF treated in this setting would also help to shape future research in this field.

## **MATERIALS AND METHODS**

This study was conducted at Moi Teaching and Referral Hospital, a tertiary care referral centre in Eldoret, Kenya, which performs over 6000 obstetrical deliveries per year. Eldoret is a city of approximately 200 000 people, and MTRH serves a referral population of 13 million from Northern and Western Kenya. Medical records of the 86 patients who underwent OF repair at MTRH between 1999 and July 2007 were examined. The sample period was chosen because of the lack of medical records available for OF patients at MTRH prior to 1999. The chart review was conducted in June and July 2007 by a single investigator (E.M.), who reviewed all charts.

All operations were performed by the same gynaecologic surgeon (H.M.). The 86 cases performed at MTRH in the years identified represent only part of this surgeon's OF surgery case load. Approximately 80% of the women returning for repeat surgical repair had their previous surgery performed by this surgeon, and approximately 80% had their previous surgery performed at MTRH. The surgical approach (transabdominal or transvaginal) was determined by the size, location, and accessibility of the fistula. Despite failure of consistent documentation, all patients underwent an intraoperative dye test to assess closure of the fistula. The dye test was repeated after 14 days; if no leakage was identified, the catheter was removed, and the patient was discharged. If leakage occurred, the catheter remained in situ for another seven to 14 days, after which the dye test was repeated. If leakage occurred a second time, a subsequent repair attempt was planned.

Standard descriptive statistical assessment was carried out. Differences in characteristics between patients presenting for follow-up who were continent and those who were incontinent were investigated. Differences between continuous variables were analyzed for significance using

## **ABBREVIATIONS**

MTRH	Moi Teaching and Referral Hospital
OF	obstetric fistula

two-tailed *t* tests. Fisher exact test was used to determine the significance of differences between categorical variables.

Ethics approval was obtained from the University of Toronto Research Ethics Board and the Institutional Research and Ethics Committee of MTRH.

## RESULTS

Patient characteristics are described in Table 1. Many of the medical records of the 86 patients included in the study had missing values for some of the categories. Frequency was calculated on the basis of the number of patients whose charts included each relevant characteristic. The 86 patients presented for OF repair at a mean age of 25.5 years (SD 7.7). Forty-six (55%) had a parity of one, and 44 (67%) were less than 20 years old at the time of their first pregnancy. Twenty-nine (35%) had experienced incontinence for one to five years at the time of presentation, with 16 women (19%) suffering from incontinence for longer than five years. Obstetrical characteristics of the patients are described in Table 2. Forty-one women (52%) required emergency Caesarean section, and 14 (18%) required instrumental vaginal delivery in the delivery preceding development of obstetric fistula. Of the 24 women who delivered by spontaneous vaginal delivery, there were 12 (50%) for whom there was no record of a skilled birth assistant. Mean duration of labour in the cohort was 56 hours, with 78% of those recorded labouring for at least 24 hours. The labours resulted in 56 stillbirths (73%), 11 neonatal deaths (14%), and only 10 children (13%) born alive and remaining well at the time of data collection. The presumed cause of OF was prolonged obstructed labour in 78 women (92%). In the remaining seven patients, OF was caused by surgical injury as a result of late Caesarean section, iatrogenic injury during Caesarean section, and ruptured uterus. The presumed cause of the fistula was determined by the surgeon.

Surgical and perioperative characteristics are described in Table 3. Transvaginal repair was conducted in 70 cases (81%), transabdominal in 12 (14%), and rectovaginal fistula repair in only 4 (5%). General anaesthesia was used in 57 cases (66%) and spinal anaesthesia in 29 (34%). Of the 86 women, 25 (29%) had undergone previous attempts at surgical repair. The mean duration of hospital stay was 20 days.

Outcomes of the surgical repairs are documented in Table 4. The most frequent complications were pain (45%) and hematuria (22%). Vaginal bleeding, septic surgical site, fever, urinary tract infection, emesis, and anemia were also commonly documented complications. Seven women (7%) were also noted incidentally to suffer from severe depression. Over

**Table 1. Patient characteristics**

Patient characteristic	Frequency
Age at presentation, years n = 85, n (%)	
10–19	12 (14)
20–29	55 (65)
30–39	10 (12)
40–49	7 (8)
> 50	1 (1)
Mean (SD)	25.5 (7.7)
Education n = 86, n (%)	
None	3 (3)
Lower primary	7 (8)
Upper primary	20 (23)
Secondary	1 (1)
Post-secondary	3 (3)
Unknown	52 (60)
Marital status n = 85, n (%)	
Married	45 (53)
Single	32 (38)
Separated	6 (7)
Widowed	3 (3)
Parity n = 84, n (%)	
1	46 (55)
2–5	27 (32)
> 5	11 (13)
Mean parity (SD)	2.6 (2.3)
Age at first pregnancy, years n = 66, n (%)	
10–19	44 (67)
20–29	21 (32)
30–39	1 (1)
Mean (SD)	18.5 (3.2)
Duration of incontinence n = 84, n (%)	
< 3 months	16 (19)
3 months–1 year	23 (27)
1–5 years	29 (35)
> 5 years	16 (19)
Mean (SD)	2.8 (4.0)

one half of the patients (57%) required their hospital fees to be waived or credited for future payment because of their financial circumstances.

Despite negative intraoperative dye tests in 71 patients (95%), 37 patients (45%) reported incontinence prior to discharge. The nature of the incontinence (failed repair versus stress urinary incontinence) was not documented. Dye tests were not consistently recorded prior to discharge.

While all patients were instructed to return to the outpatient clinic for follow-up three months after discharge, only 32 (37%) returned. Of these, 15 patients (47%) were continent and 17 (53%) were incontinent. In assessing these two groups of patients who returned for follow-up, there were no significant differences between the two groups in the age at presentation ( $P = 0.09$ ), age at first pregnancy ( $P = 0.30$ ), parity ( $P = 0.26$ ), duration of labour ( $P = 0.08$ ), mode of delivery ( $P = 0.45$ ), or perinatal status ( $P = 0.15$ ). There was a significant difference between the two groups in having had previous failed repairs ( $P < 0.001$ ) and larger size of fistula ( $P = 0.003$ ); large fistulas were defined as those larger than 2 cm. Conditions concurrent with vesicovaginal fistula, such as rectovaginal fistula, amenorrhea, female genital cutting, vaginal stenosis, peroneal nerve lesion, and depression, were all noted more frequently in women who remained incontinent following surgery, although these did not reach statistical significance. The Waaldijk classification system was occasionally used to document the severity and type of fistula, but its use was not consistent enough to allow analysis. Urethral injury, degree of scarring, and presence of female genital mutilation were not consistently recorded. However, of the 17 women who were incontinent at follow-up, six had some degree of urethral injury documented prior to surgery, and 10 had some degree of vaginal stenosis documented.

## DISCUSSION

The common finding of OF and the frequency of prolonged labour in rural Western Kenya reflect the lack of adequate emergency obstetric care in this setting. The high proportion of stillbirths in this cohort (73%) and the association of OF with prolonged obstructed labour demonstrate an unmet need for emergency obstetrical care in this population. Many deliveries in Western Kenya are conducted by traditional birth attendants who lack training in the skills required to treat obstetric emergencies, including Caesarean section. Primary prevention of OF is therefore the key to its eradication, and it includes the improved referral of women for prompt emergency obstetrical care. Prevention of OF further requires broad measures extending beyond the health care systems, including improved infrastructure and roads, improved status of women to allow them to seek timely care, and measures to reduce associated factors such as cephalopelvic disproportion, which is associated with malnutrition and pregnancy at an early age.<sup>3,7</sup>

In analysis of the preoperative characteristics of the women who returned for follow-up, only previous failed repairs (difficult-to-repair fistulas) and size of fistula were

**Table 2. Obstetrical characteristics**

	n (%)
Labour $\geq$ 24 hours (n = 47)	37 (78)
Duration of labour, hours (n = 47)	56 (36)*
Mode of delivery (n = 79)	
Caesarean section	41 (52)
Spontaneous vaginal delivery	24 (30)
Instrumental vaginal delivery	14 (18)
Perinatal status (n = 77)	
Stillbirth	56 (73)
Neonatal death	11 (14)
Alive and well	10 (13)
Presumed cause of fistula (n = 85)	
Prolonged obstructed labour	78 (92)
Surgical injury	7 (8)
* mean (standard deviation)	

**Table 3. Surgical and perioperative characteristics**

Surgical and perioperative characteristics (n = 86)	Mean (SD)
Previous surgical repair attempts	25 (29)
Duration of postoperative stay, days	20 (9.6)*
	Frequency, n (%)
Surgical approach	
Transvaginal	70 (81)
Transabdominal	12 (14)
Rectovaginal fistula repair only	4 (5)
Type of anaesthesia	
General	57 (66)
Spinal	29 (34)
Use of auxiliary services	
Physiotherapy	42 (49)
Psychiatry	18 (21)
Hospital fees	
Waived	35 (41)
Credited for later payment	14 (16)
* mean (standard deviation)	

**Table 4. Outcomes of obstetric fistula repair**

	Frequency, n (%)
Dye test (n = 75)	
Negative	71 (95)
Positive	4 (5)
Incontinence following surgery/before discharge (n = 82)	37 (45)
Postoperative complications (n = 86)	
Pain	39 (45)
Hematuria	19 (22)
Vaginal bleeding	8 (9)
Septic surgical site	9 (10)
Fever	7 (8)
Urinary tract infection	7 (8)
Emesis	13 (15)
Anemia	7 (8)
Urethral stenosis	5 (6)
Depression	7 (8)
Peritonitis	1 (1)
Pneumonia	1 (1)
Follow-up (n = 31)	
Continent	15 (47)
Incontinent	17 (53)

found to be significantly related to ongoing incontinence. Because larger fistulas are more complicated and difficult to repair,<sup>5</sup> these two variables may not be independent of each other. However, the significant difference in postoperative success between women with small fistulas (< 2 cm) and those with large fistulas (> 2 cm) found in this study demonstrates the importance of primary and secondary prevention to prevent difficult-to-repair fistulas. The difference in duration of labour between women with continued incontinence and those who were continent reached a level of significance of only 0.08, a finding consistent with another study.<sup>10</sup> While this may be attributed to lack of power, it is possible that the severity of the fistula is related not to the duration of labour itself but to the strength or duration of contractions. It is reasonable to suggest that limiting the duration of obstructed labour through access to emergency obstetrical care may prevent large, complicated fistulas that are more difficult to repair.

While this study identified a 95% closure rate, as determined by a negative intraoperative dye test, it is important to note that 45% of patients experienced some form of incontinence prior to discharge. It is not clear from the hospital records whether this was a result

**Table 5. Characteristics of patients who presented at follow-up**

	Continent (n = 15)	Incontinent (n = 17)		
	Mean (SD)		t (df)	P
Age at presentation	27.5 (9.5)	22.6 (5.1)	1.78 (29)	0.09
Age at first pregnancy	18.8 (4.2)	17.4 (2.4)	1.05 (25)	0.30
Parity	3.1 (2.6)	2.1 (2.0)	1.15 (26.5)	0.26
Duration of labour	46 (24.5)	73 (40.7)	1.86 (15.4)	0.08
Number of previous failures	0.1 (0.3)	1.6 (1.5)	4.03 (30)	<0.001*
	Frequency, n (%)		95% Fisher exact	
Mode of delivery			0.45	
Caesarean section	8 (57)	7 (44)		
Spontaneous vaginal	2 (14)	6 (38)		
Instrumental vaginal	4 (29)	3 (19)		
Perinatal status (n = 14)			0.154	
Stillbirth	10 (67)	16 (94)		
Neonatal death	1 (7)	1 (6)		
Alive and well	3 (20%)	0		
Previous repairs			< 0.001*	
None	14 (93)	5 (29)		
Previous failure	1 (7)	12 (71)		
Size of fistula (n = 16)			0.003*	
Small (< 2 cm)	12 (80)	4 (25)		
Large (> 2 cm)	3 (20)	12 (75)		
Concurrent conditions				
Rectovaginal fistula	3 (20)	4 (24)		
Amenorrhea	5 (33)	9 (53)		
Female genital mutilation	1 (7)	2 (18)		
Vaginal stenosis	3 (20)	8 (47)		
Peroneal nerve lesion	1 (7)	3 (18)		
Depression	0	7 (41)		

\*Significant at P < 0.05

of surgical failure to close the fistula or of exposing underlying stress urinary incontinence; both are, of course, considered clinically significant. Stress incontinence may resolve for some women, but for those who returned for follow-up three months later, 54% complained of urine leakage. One possible interpretation of this is that patients with persistent incontinence of any kind were more likely to return for follow-up and further treatment. This has also been documented in an Ethiopian study.<sup>11</sup> Another possibility is that stress incontinence is a complication of surgical OF repair, regardless of surgical outcome, due to the loss of continence mechanisms associated with urethral damage and reduced bladder capacity. In a recent editorial, Wall and Arrowsmith emphasized the importance of this “continence gap,” or the presence of continued stress incontinence in women who had surgery that was technically successful.<sup>12</sup> Better follow-up data and prospective data to determine potentially predisposing factors for postoperative stress incontinence will help to describe and identify measures, surgical or otherwise, to prevent this phenomenon. As Goh et al.<sup>13</sup> were able to show in a study published following the completion of the present study, a standardized classification system documenting degree of scarring and urethral injury was able to predict persistent incontinence.

Because OF disproportionately affects a very socially marginalized population of women, financial constraints continue to be a barrier to accessing OF repair. While 41% of women who underwent repair at MTRH had their hospital user fees waived and 16% had their fees credited, women who are not able to pay for initial assessment in the outpatient clinic cannot have these fees waived (H. Mabeya, oral communication, July 2007). This again emphasizes the importance of primary prevention of OF. It is unknown how many women may have been affected by such barriers during the course of the study period.

## **CONCLUSION**

Obstetric fistula remains a major problem for women in resource poor settings, resulting in significant physical and social morbidity for women in regions such as Western Kenya, where our study was conducted. The major limitation of this study was the incompleteness and inconsistency of the medical records. Development of a prospective database to standardize the collection of patient information across this and other sites performing large volumes of OF surgery would facilitate future research, including trials of surgical and postoperative techniques. Improved data collection could further lead to the creation of widely disseminated guidelines for the prevention and treatment of OF. The enormous

backlog of women suffering with unrepaired fistulas will not be eliminated until access to curative surgical procedures is independent of the ability to pay. This problem would be better solved by providing all women, irrespective of their social and economic status, access to competent obstetrical care during pregnancy and labour and delivery.

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