A clinical audit of female urinary incontinence at a urogynaecology clinic of a tertiary hospital in Durban, South Africa

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Background. Urinary incontinence (UI) is a common condition with an increasing prevalence worldwide. Although it is not a life-threatening condition, it can be very disabling.
Objective. To describe the clinical profiles, risk factors, diagnosis, treatment and clinical outcomes of women with different subtypes of UI who attended a tertiary hospital in Durban, South Africa.
Methods. A retrospective chart review was performed. A structured data form was used to obtain the relevant information.
Results. Seven hundred and fifty-eight of 945 charts with a diagnosis of UI were analysed. Stress urinary incontinence (SUI) was the most common subtype of UI (30%). The mean (standard deviation (SD)) age was 50.9 (15.2) years; mean (SD) parity 2.8 (1.4) and mean (SD) body mass index 29.2 (5.3) kg/m^2. Indians (n=366, 48.3%) were the predominant racial group; black Africans constituted 32.7% (n=248). Mid-urethral tape was the preferred surgical treatment for SUI (n=134, 62.0%). Urge UI was treated mainly with pharmaceutical agents (n=138, 74.2%) with physiotherapy as adjunctive therapy. Urogenital fistulas were repaired via laparotomy (n=42, 53.9%) and vaginally (n=25, 32%). Mid-urethral tapes and Burch colposuspension had success rates of 97% and 83.3%, respectively. Both laparotomy and vaginal fistula repairs had success rates of 95%.
Conclusions. Stress UI was the most common subtype of UI observed in this study. Patients were predominantly Indians and overweight or obese. The majority of patients with urogenital fistulas were black Africans. Surgical outcomes at our centre were in keeping with those in international reports.

S Afr J Obstet Gynaecol 2015;21(2):33-38. DOI:10.7196.SAJOG.983

Urinary incontinence (UI) is common in females and a major global health problem.[1] Although not a life-threatening condition, it can be disabling. It has been shown to have major physical, social and psychological impact on the quality of life.[1]

The prevalence of UI is difficult to estimate because the definition varies between researchers and the thresholds of complaints differ among women. Approximately 35% of women experience some form of UI, and on average one in four will seek medical help.[2] The prevalence of socially disabling incontinence (i.e. resulting in fear of and lack of interaction with people) is much lower, at about 2%.[3]

Racial differences have been postulated to be an associated factor in UI. Women of varying racial groups have different distributions of symptoms, different conditions causing their UI and different risk profiles for this condition.[1]

Besides the management of urogenital fistula (UGF), other subtypes of UI have received very little medical attention in sub-Saharan Africa. This is understandable given the limited resources and high burden of deadly diseases such as HIV, tuberculosis and malaria. However, with increasing emphasis on quality-of-life issues and women's awareness of available treatment options for UI, many women are now seeking help, resulting in UI becoming a major health problem. A urogynaecology unit (UGU) was commissioned at Inkosi Albert Luthuli Central Hospital (IALCH), Durban, South Africa, in 2003 and patients from the Durban metropolis and KwaZulu-Natal Province were referred to the unit.

Objective

To establish the aetiological factors, demographic data, clinical profiles, treatment and clinical outcomes of women with UI referred to the UGU.

Methods

Study design

This was a retrospective audit involving analysis of the clinical notes of women who presented to the urogynaecology clinic from January 2004 to December 2011. Information was obtained from a computerised database using a structured data sheet.

Definitions

Urinary incontinence. According to the International Continence Society, UI is defined as 'involuntary loss of urine which is objectively demonstrable and with a social or/and hygienic problem'.[4] UI can present either as total incontinence (i.e. continuous leakage of urine) or as intermittent episodes. The latter present as stress urinary incontinence (SUI), urge urinary incontinence (UUI), mixed urinary incontinence (MUI) and overflow UI.

Successful outcome. Successful management indicated that the patient had remained continent for a period of 1 year following treatment.

Unit management protocol (summary)

First visit

A detailed relevant history and examination were followed by basic investigations, viz. full blood count, renal function tests (urea and electrolytes), urine microscopy, culture and sensitivity and a bladder diary. Specific investigations included urodynamic studies (UDS), pelvic sonography, a voiding cystourogram (VCU) and computed tomography intravenous pyelogram (CT-IVP); these were done where appropriate. Patients with a presumptive diagnosis of SUI/MUI/UUI were all referred for physiotherapy, lifestyle modifications, medical treatment for urogenital infections and the use of vaginal devices where applicable. Patients with signs and symptoms of a UGF were admitted for investigations and assessment of location, size and number of fistulas for adequate planning of surgical treatment.

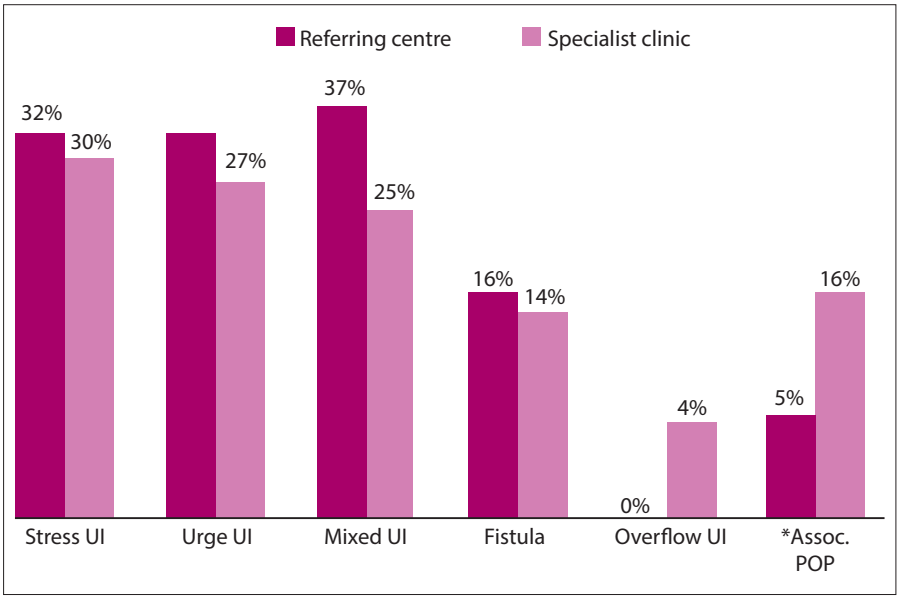

*Fig. 1. Comparison of initial diagnosis at referring centre and definitive diagnosis at the specialist clinic. (Assoc. POP = associated pelvic organ prolapse; *Presented with a subtype of UI in association with POP.)*

Second visit

This included a review of the results of all investigations, and an objective diagnosis was made. All patients confirmed as having intermittent UI were then reassessed to identify any improvement of symptoms and plan for definitive treatment.

Follow-up post definitive therapy

Patients were assessed at 1-month, 3-month, 6-month and 1-year intervals following treatment. Clinical outcomes were assessed at each visit. The final surgical outcome was assessed at 1 year, while patients on medical management were followed up for 5 years.

Study population

The study population was multiracial with varying cultural background and religious beliefs, comprising whites, black Africans, Indians and coloureds. The women were mainly of low socioeconomic status.

Statistical analysis

All data were analysed using the Statistical Package for Social Sciences, version 21 (IBM, USA).

The independent sample *t*-test for equality of means (unequal variance assumed) was used to calculate the *p*-values for continuous data such as age, parity and body mass index (BMI), while the Pearson χ^2 test was used for categorical data. A *p*-value of <0.05 was considered significant.

Descriptive statistics, namely frequencies and percentages, bar chart for categorical data, means and standard deviations (SDs) or medians and percentiles for continuous data, as appropriate, were calculated.

Results

There were 945 cases recorded. Of these patients, 141 were incorrectly booked to the clinic while 46 were referred for UDS. A total of 758 women who had UI over the 8-year study period were therefore included in the analysis.

Comparison of diagnosis at referring centre and specialist clinic (Fig. 1)

The most common type of UI diagnosed at the referring clinic was MUI, followed by SUI, while the most common subtype following definitive diagnosis was SUI, followed by UUI. There was a notable discrepancy between the diagnoses made at the referring centre and those at the UGU, as shown in Fig. 1.

All patients with a diagnosis of overflow UI were referred to a urologist for further management.

Detailed demographic characteristics (Table 1)

The mean (SD) age was 50.9 (15.2) years (range 13 - 84). Frequency of UI reached a peak in the age group 40 - 49 years. The mean parity was 2.8 (1.4) (range 0 - 5). UI was most common in obese/morbidly obese patients (38.8%), closely followed by those classified as overweight (38.4%).

It was noted that the predominant race was Indian, followed by black African.

Table 1. Detailed demographic characteristics of all patients

Characteristics	*n* (%)
Age (years)	
<19	26 (3.4)
20 - 29	42 (5.5)
30 - 39	98 (12.9)
40 - 49	192 (25.3)
50 - 59	180 (23.7)
60 - 69	146 (19.3)
70 - 79	62 (8.2)
≥80	12 (1.6)
BMI*	
Underweight (<18.5)	8 (1.1)
Normal (18.5 - 25)	188 (24.8)
Overweight (25.1 - 30)	268 (38.4)
Obese/morbidly obese (>30)	294 (38.8)
Racial group	
Black African	248 (32.7)
White	96 (12.7)
Indian	366 (48.3)
Coloured	48 (6.3)
Parity	
0	56 (7.4)
1	70 (9.2)
2	208 (27.4)
3	206 (27.2)
4	108 (14.2)
≥5	110 (14.5)

*WHO classification.

Specific UI and demographic characteristics (Table 2)

UGF was most common in the age group 20 - 49 years.

Urge UI was maximal in the 60 - 69-year-old age group, SUI in 50 - 59-year-olds and MUI in the 40 - 49-year-olds, and associated pelvic organ prolapse (POP) in women older than 60 years.

The incidence of SUI increased with parity, while UGF was found to be highest among para 1s. MUI was common in nulliparas, but the peak incidence was in para 3s.

SUI predominates in obese/morbidly obese patients. UGF and UUI did not show any significant association with a particular BMI category.

UGF occurred predominantly among black African women (85.8%).

Mode of delivery (Table 3)

Table 3 shows that women who had vaginal deliveries had a high rate of operative interventions; however, the rates of normal (uncomplicated) vaginal delivery (18.7%) and caesarean section (17.2%) are relatively similar.

Aetiology and race in urogenital fistula (Table 4)

Most patients with UGF were black Africans. The proportion of fistulas occurring secondary to gynaecological surgery was 28.2%.

The aetiological factors for UGFs were predominantly related to obstetric injury, constituting nearly two-thirds of the patients. Prolonged labour was the most common factor, followed by forceps delivery.

Subgroup analysis: black African v. Indian (Table 5)

Comparative analyses between black African and Indian women with UI, based on demographic data as well as associated chronic medical conditions, are illustrated in Table 5.

Associated comorbid conditions such as hypertension (*n*=212), diabetes (*n*=106), respiratory disorders (*n*=79) and connective tissue disease (*n*=56) were not uncommon in this study. The Indian group significantly had higher frequencies of associated hypertension, connective tissue disorders and diabetes.

Specific investigations and definitive treatment

Table 6 shows that UDS were done in half of the patients with intermittent UI, VCUs were done in 95.8% and CT-IVP was done in addition to VCU in 75% of women with UGF.

Table 2. Distribution of clinically relevant demographic data and their relation to specific subtypes of UI

Demographic data	SUI (%)	UUI (%)	MUI (%)	Fistula (%)
Age groups (years)				
<20	0	1.2	0	13
20 - 29	0	1.2	2.6	26.1
30 - 39	7.7	13.4	9.2	23.9
40 - 49	27.5	23.2	30.3	28.3
50 - 59	39.6	20.7	25	4.3
60 - 69	16.5	32.9	15.8	4.3
70 - 79	8.8	7.3	13.2	0
≥80	0	0	3.9	0
Parity				
0	0	17.7	21.3	21.8
1	8.9	14	7.2	47.2
2	18.8	16.1	16.9	14.6
3	24	12.7	24.2	6.6
4	25.3	20.1	11.3	9.8
≥5	23	19.4	19	0
BMI				
Underweight (<18.5)	0	0	0	100
Normal (18.6 - 25)	25.7	29.8	24.3	20.2
Overweight (25.1 - 29.9)	31.6	29.8	24.6	14
Obese + morbidly obese (≥30)	31.2	24.3	26.8	17.7
Racial group				
Black African	16.9	29.0	12.3	85.8
White	32.7	2.5	29.3	5.2
Indian	25.1	35.4	30.1	9.0
Coloured	25.3	33.2	28.3	0

Table 3. Mode of delivery in all patients with UI

Delivery	*n* (%)
Vaginal delivery	593 (61.9)
Normal vaginal delivery	179 (18.7)
Complicated by episiotomy/ perineal tear	227 (23.7)
Operative vaginal delivery	187 (19.5)
Vacuum	29
Forceps	158
Caesarean section	165 (17.2)

Table 4. Aetiological factors and race in patients with UGF (*N*=78)

	n (%)
Aetiological factor	
Obstetric-related	51 (65.3)
Prolonged labour	24
Caesarean section	10
Hysterectomy (post partum)	5
Forceps delivery	12
Gynaecological	22 (28.2)
Abdominal hysterectomy	14
Vaginal hysterectomy	8
Others	5 (6.5)
Foreign body	3
Sexual assault	1
Self-inflicted (psychiatric patient)	1
Race	
Black African	67 (86.0)
White	1 (1.3)
Indian	8 (10.1)
Coloured	2 (2.6)

Specific treatment modalities varied according to specific diagnoses, as shown in Table 6.

Follow-up and clinical outcomes

The outcomes of specific management of each type of UI are summarised in Table 7. Of the 172 procedures performed for SUI, 157 (91.3%) were successful, mid-urethral tape (MUT) insertions being most effective (97%). The success rate for UGF repair was 94.9%; both abdominal and vaginal approaches of repair were successful (95.2% v. 96%).

UUI was predominantly managed with pharmacotherapy; 69.1% of women reported relief of symptoms in the first 6 months, with some having recurrence of symptoms at a later stage.

Surgical complications

Eighteen patients had varying complications:

One patient each had bladder and bowel injuries; both were recognised intraoperatively and repaired successfully.

Four patients had surgical site infections leading to breakdown of vesicovaginal fistula (VVF) repair; 4 cases of postoperative urinary tract infection (UTI) were successfully treated with intravenous antibiotics.

Urinary retention occurred in 2 cases following MUT insertion; patients underwent reoperation to release tension on the tape.

Two patients who presented with MUI associated with POP had symptoms of SUI following repair of prolapse; these symptoms were persistent and required MUT insertion. Two had mesh exposures following MUT insertion and another 2 had recurrence of POP.

Discussion

There is great variation in the prevalence of UI in different regions of the world. The highest prevalence of UI was reported from the USA, where Raza-Khan *et al.*[5] reported rates of 70% and 75% of peripartum UI prevalence in nulliparous and multiparous women, respectively.

The distribution of the types of UI in our audit was as follows: 30% had SUI, 27% had UUI, 25% had MUI and 14% had fistula (overflow UI 4%). These figures are slightly lower than in other studies. Our audit only evaluated women referred to our specialist clinic (i.e. it is not a population-based study). Further, we reported four subtypes (SUI, MUI, UUI and fistula) rather than the three (SUI, MUI and UUI) that are usually reported, as we included women with UGFs, which are frequently referred to our unit.

SUI was found to be the most common subtype, which is consistent with most studies,[3] although MUI has been reported to be the leading subtype in few studies.[5]

There was a wide variation in the diagnosis of the different subtypes of UI between referral health facilities and the specialist clinic (IALCH). This is not surprising, since lower levels of healthcare facilities were managed by medical officers who probably lacked adequate expertise and equipment such as UDS in order to make a definitive diagnosis of UI. Hence there was an overdiagnosis of SUI and MUI from referral facilities, with a paradigm shift to UUI and overflow UI following UDS.

This study shows a 49.1% utilisation of UDS in the preoperative diagnosis of SUI, indicating that it is not employed as a mandatory preoperative diagnostic tool for non-complicated and easily demonstrable SUI. This is corroborated by the conclusion of a recent randomised control trial from the USA (ValUE study[6]), which demonstrated that preoperative office evaluation alone was not inferior to evaluation with urodynamic testing in women with uncomplicated demonstrable SUI.

The prevalence of UI differs with age. It was low in the age group <19 years, peaked in the age group 40 - 59 years (24.5%) and subsequently decreased in age groups over 60 years. In comparison the EPINCONT study,[7] a large Norwegian study on the epidemiology of UI, found an increasing

Table 5. Analyses of risk factors: black African v. Indian

Variables	Total (*n**)	Black African (%*)	Indian (%*)	*p*-value
Age, years†	50.9	43.3 (16.9)	53.2 (12.4)	<0.01
Parity†	2.8	2.4 (1.5)	2.7 (1.2)	0.06
BMI‡	29.2	28.9	29.3	0.50
Diabetes	106	35.3	52.7	<0.049
Hypertension	212	26.7	60.3	<0.011
Connective tissue disease	56	27.0	52.5	<0.04
Respiratory disorders	79	37.1	28.1	0.40
Neuromuscular disease	34	19.0	30.4	0.10

*Unless otherwise indicated.
†Mean (SD).
‡Mean.

Table 6. Specific managements of UI

	n (%)
Specific diagnostic investigations	
Intermittent UI	
UDS	248 (49.1)
VCU	143 (28.4)
UDS +VCU	52 (10.2)
Sonar	62 (12.3)
Urogenital fistula	
VCU (total)	69 (95.8)
CT-IVP + VCU	54 (75.0)
Sonar (in addition)	12 (16.7)
Specific definitive treatments	
SUI	
MUT	134 (62.0)
Burch colposuspension	18 (9.5)
Physiotherapy + neuromodulation	38 (17.9)
Periurethral bulking	20 (10.6)
UUI	
Oxybutynin	130 (69.9)
Oxybutynin + imipramine	8 (4.3)
Physiotherapy only:	36 (19.3)
Pelvic floor exercise	32 (17.2)
Pelvic floor exercise + electrostimulation	4 (2.1)
Botox	12 (6.5)
Fistula	
Laparotomy	42 (53.9)
Vaginal repair	25 (32.0)
Laparotomy + vaginal	10 (12.8)
Laparoscopy	1 (1.3)

MUT = midurethral tape.

Table 7. Clinical outcomes of management

Management/procedure	*n* (%)
Stress urinary incontinence (SUI)	
MUT (TVT/TOT)	134 (100.0)
Successful	130 (97.0)
Failed: incontinent	2 (1.5)
Urinary retention	2 (1.5)
Total failure	4 (3.0)
Burch colposuspension	18 (100.0)
Successful	15 (83.3)
Failed	3 (16.7)
Periurethral bulking	20 (100)
Successful	12 (60.0)
Recurrence	8 (40.0)
SUI overall success	157 (91.3)
Urogenital fistula (UGF)	
Laparotomy (abdominal)	42 (100.0)
Successful	40 (95.2)
Failed	2 (4.8)
Laparoscopic repair	1 (100.0)
Successful	1 (100.0)
Failed	0
Vaginal approach	25 (100.0)
Successful	24 (96.0)
Failed	1 (4.0)
Combined (vaginal + abdominal)	10 (100.0)
Successful	9 (90.0)
Failed	1 (10.0)
UGF overall success	74 (94.9)
Outcome of medical treatment (UUI + MUI)	
Satisfactory	94 (31.5)
Effective initially	61 (20.5)
Not effective	104 (34.0)
Defaulted	39 (13.1)
Relief of symptoms	
1 - 6 months	76 (69.1)
7 - 12 months	26 (23.6)
1 - 2 years	2 (1.8)
2 - 5 years	6 (5.5)

TVT/TOT = tension-free vaginal tape/transobturator tape.

prevalence during young adult life (20 - 30%), a broad peak around middle age (30 - 40%), and then a steady increase in the elderly (30 - 50%). The decreased prevalence observed in our study in the 70s - 80s age groups may be due to the fact that the older generation accept UI as part of the normal ageing process, may be ignorant of the availability of treatment modalities, or are embarrassed to present with these complaints.

Overweight and obesity were common in our patient profile (77.2%). These findings are congruent with several studies which have reported that a higher BMI is a risk factor for UI.[8] Obesity is a modifiable condition, and it has been reported that with loss of weight, resolution of some types of UI may occur.[8]

An association between UI and comorbid ailments such as diabetes, connective tissue disorders and hypertension has been reported previously in other studies.[9] Our study showed a statistically significant difference in the occurrence of diabetes, hypertension and connective tissue disease among Indians compared with black Africans; this may explain the preponderance of UI among Indians.

The relationship of UI to route of delivery (vaginal and abdominal delivery) is conflicting. Our study showed an increased frequency of UI among patients who had vaginal delivery compared with caesarean section (CS). This may be related to the high percentage of instrumental delivery, difficult labour, perineal trauma and/or episiotomy during vaginal delivery.

A study by Chaliha *et al.*[10] showed that elective CS may protect against the development of SUI, but the risk of faecal incontinence and other urinary symptoms including UUI may not be reduced. However, McKinnie *et al.*,[11] in a multicentre study on the prevalence of urinary and faecal incontinence after vaginal delivery and CS, found an increased risk of developing UI following pregnancy but no difference in the development of UI between vaginal delivery and CS groups. These authors concluded that CS does not decrease the risk of urinary or faecal incontinence compared with vaginal delivery.[11]

UGFs occurred predominantly following obstetric complications (65.3%). This is corroborated in the *Saving Mothers Report* (2008 - 2010),[12] which suggested that poor intrapartum care and lack of skills in instrumental deliveries may be implicated in the frequency of maternal deaths and morbidity due to obstructed labour. It was recommended that all healthcare workers involved in maternity care should be trained in the ESMOE-EOST programme module.[12]

It was disturbing that hysterectomy contributed to 28.4% of fistulas in our study. Previous CS, enlarged multifibroid uteri and excessive intraoperative bleeding were three contributing risk factors for the development of fistulas. Urinary fistulas as a result of gynaecological surgery need to be critically evaluated.

The surgical procedure of choice in the management of SUI in our unit is MUT. The 1-year success rate of MUT was 97% in our series of 134 patients; the majority had transobturator tape (TOT) repair. The Evaluation of Transobturator Tapes (E-TOT) study was the first high-quality randomised controlled trial, and included a 1-year follow-up study.[13] In their 1-year follow-up, a success rate of 81%, a 73% patient-reported success rate and a 70% satisfaction rate for TOT after 2 years was reported, indicating a significant deterioration over time. Although it is not easy to explain the difference in success rates between our audit and the multicentre E-TOT study, the latter had a variety of surgeons with differing experience performing the surgical intervention. In our study there was a single surgeon, which may have contributed to the higher success rate.

Specific to UGFs, the overall success rate in our study was 94.9%. The results of fistula surgery are influenced by a variety of factors including fistula site, size and degree of scarring. In addition, the number of previous repair attempts, the severity of the lesions, the overall health of the patient, the availability of health facilities and the experience and expertise of the surgeon are important factors in successful surgical closure of obstetric fistulas.

Lee *et al.*,[14] in a retrospective chart review from 1996 to 2011, reported on 66 patients with VVFs, 42 undergoing primary treatment (n=31 vaginal approach v. n=11 abdominal); the overall repair success rate was 97%. It is difficult to compare the success rates between the two studies, as Lee *et al.* had no patients with complex UGFs as seen in our study. Furthermore, most patients in our study were from a poor socioeconomic background and often presented late to hospital, as also reported by Ramphal *et al.*[15]

The abdominal route of fistula repair predominated in our study (42 abdominal v. 25 vaginal). This was determined by the following factors, set as prerequisites for determining the operative route of repair in our unit: the abdominal route is preferred if the fistula site is in close proximity to, or involves, the ureter, the trigone area of the

bladder or the uterus, or if there are multiple fistulas, a contracted vagina or poor vaginal access to the fistula site. The route of repair had no bearing on the surgical outcome, and this is in keeping with a study by Cron.[16] However, Cron reported that 85% of VVFs could be repaired successfully at the first attempt, and that closure rates were similar in the transvaginal and transabdominal routes.[16] This is consistent with findings in our study (95.2% abdominal v. 96% vaginal).

Study limitations and strengths

No detailed record of deliveries was available, as most of these patients were referred from rural district and regional hospitals and referral notes were scanty.

The data on specific medical management for UUI and MUI were combined, so distinct outcome of treatment for either could not be assessed because of difficulty in stratifying this information.

This was not a population-based study, so it was difficult to make any inference on the epidemiology of the condition with regard to racial and age distributions observed.

However, one of the strengths of the study was that management of all the patients was carried out by a single specialist, vastly experienced in the management of female UI.

Conclusions

The distribution of each subtype of intermittent UI is similar to high-income countries and the underlying risk factors are similar. SUI was found to be the most common subtype of UI.

Successful treatment probably depends on the experience of the healthcare provider. The establishment of a urogynaecology subspecialty has played a major role in the management of UI.

UGF, particularly secondary to obstetric complications, was relatively common in our study. Its frequency is in keeping with results from low- and middle-income countries, particularly in sub-Saharan Africa.

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