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(RESEARCH ARTICLE)

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The etiology of major, acquired female urogenital and rectovaginal lesions in Port Harcourt, Nigeria

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Abstract

Introduction: New and emerging trends in the causation of urogenital and rectovaginal lesions, and changing patterns of behavior of female patients with the diseases were observed. The aim of this study is to determine the risk factors and etiology of these diseases.

Methods: This was a cross-sectional observational study of records of consecutive female patients operated on at the University of Port Harcourt Teaching Hospital (UPTH), Nigeria, with major urogenital and rectovaginal lesions from 01/01/2018 to 31/12/2022. Each patient's records, sociodemographic data, clinical assessment, laboratory investigations, diagnosis, and intraoperative findings were studied and recorded. Data obtained were analyzed with simple statistics, and presented in charts prose, and tables.

Results: Twelve major cases were found and studied. Their age statistics (in years) were as follows: mean age, 38.6±11.5; median, 34; and age range of 25 to 68. Ten of them were within the childbearing age (15-45 years). One patient had a uterocutaneous fistula with subcutaneous endometriosis. Another had anorectal carcinoma with rectovesical and rectouterine fistulas. One had uterovesical fistulas with menouria (Youssef's syndrome), and the fourth had uterovesical fistula with a perineal tear. Four patients had uterovaginal prolapse, and 4 had vesicovaginal fistulas. Obstetric and gynecological trauma and sexual battery accounted for nine of 12 cases. The patients had high-risk pregnancies but had antenatal care and labor managed by either traditional birth attendants or primary healthcare staff at peripheral institutions.

Conclusion: Most of the risk and etiological factors of the lesions were found modifiable. Appropriate measures have been suggested for the management and prevention of the lesions.

Keywords: Urogenital and rectovaginal lesions; Acquired and major; Etiology in females; Port Harcourt; Nigeria

1. Introduction

Urogenital and rectovaginal lesions are common in urological and surgical practices. They occur in both sexes and may be acquired or (more rarely in adults), congenital [1]. Irrespective of their causes or locations in the pelvis or at the external genital organs in females the functional and cosmetic complications can be devastating, especially on family life [2]. Over the years, we successfully managed most of these lesions in our specialist hospital. Despite these successes, we observed increasing failure of patients with these lesions to pay for investigations and treatment. Many either deferred or abandoned their treatment schedules because of poverty. Secondly, we observed new and emerging trends in the causation of the lesions.

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The aim of this study is to determine the etiological factors of these lesions in the female population of adult female patients that presented to our hospital within the past approximately five years. It is hoped that this study will provide a useful information for the development of cheaper and more cost-effective services for the female population.

2. Materials and Methods

This study was a cross-sectional observational study of all records of patients with major urogenital and rectovaginal surgical lesions treated at the University of Port Harcourt Teaching Hospital (UPTH) Port Harcourt from January 1, 2018 to December 31, 2022. Hospital registration numbers of the patients were obtained from patients' registers at the Obstetrics and Gynecology Outpatient Clinics, Antenatal and Postnatal Wards, Gynecological Isolation Ward, Female Urology Ward and the Urology Clinic of the hospital. These registration numbers were used to trace all the case files of all the patients treated with major urogenital and rectovaginal during the study period which were placed at the Health Records Department. Additional information, where necessary, was obtained from the Computerized Hospital Patients' Database. Using a common proforma the following data were studied and recorded about each patient: socio-demographic information, patient's presenting complaints, details of history of referral from peripheral hospital(s), first presentation at UPTH, possible causes, diagnosis and treatment the urogenital and rectovaginal disease were noted. Also noted were the parity, and previous obstetric, gynecological and surgical histories. Histories of trauma, congenital lesions, and past medical treatments were studied. The hospital's criteria for classification diseases as minor, sub-major and major were adopted in this study. Data were obtained were collated with simple statistics and presented in prose, charts and tables, using the Microsoft Excel. Ethical approval of the study was obtained from the Ethics Committee of the University of Port Harcourt Teaching Hospital, before commencement of the study

3. Results

Sociodemographic characteristics of the patients: In this study, 12 consecutive patients treated within the study period with urogenital and rectovaginal lesions were studied. Ten of them were within the childbearing age (15-45 years). Their age statistics (in years) were as follows: mean age, 38.6±11.5; median, 34; and age range of 25 to 68. Two of the patients had primary level of education. The rest had at least secondary education, and various levels of tertiary education. Ten of them were married. Two were dependent on relatives and their parents. One patient had rectovaginal and rectouterine fistulas which were complications of anorectal cancer. Lesions in the rest were either direct or indirect complications of obstetrics and gynecological practice (Figure 1). One patient with vesicouterine fistula had type 1 Youssef syndrome [3].

The various lesions are presented in Figure 1 with their frequencies and percentages.

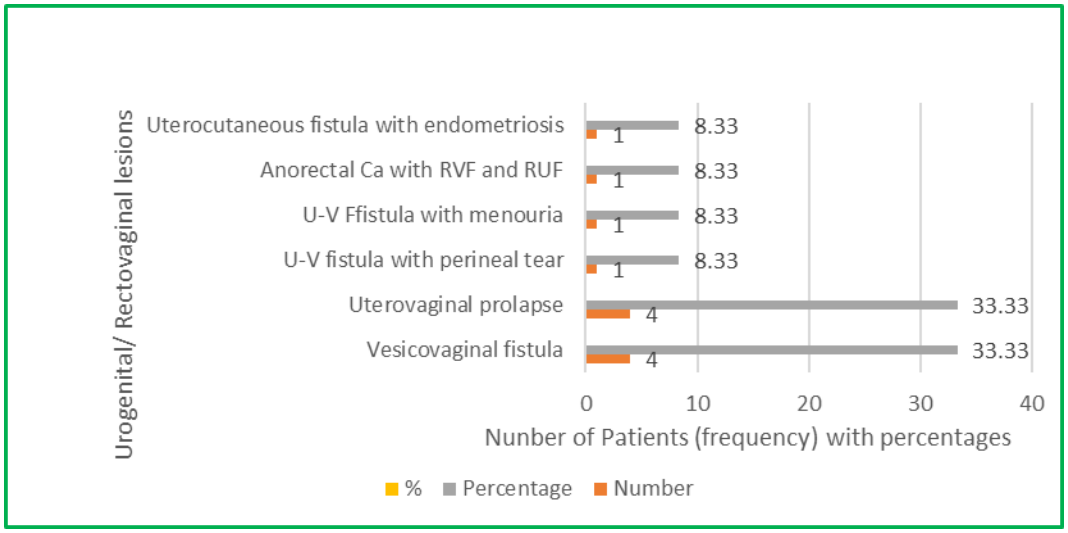

Figure 1 Urogenital and rectovaginal lesions in Port Harcourt, Nigeria, frequencies (number of patients), and percentages. Ca, carcinoma; RVF, rectovaginal fistula; RUF, rectouterine fistula; U-V, Utero-vesical

The columns of cells in Table 1 are marked A, B and C. Column C contains the possible etiological factors distilled from patients' history, physical examination and laboratory investigations. The most common comorbidities and complications of these pelvic and lower urogenital lesions were hypertension (4 patients), pelvic inflammatory disease (three), and urinary tract infection (UTI). Organisms cultured from them included pseudomonas species, Klepsiella and Escherichia coli.

Additional problems in those with utero-vaginal prolapse included ulceration of prolapsed cervix and body of the uterus, vaginal walls. These developed frequent ulcerations with secondary hemorrhage and moderate to severe anemia.

Table 1 Column A, diagnosed urogenital and rectovaginal lesions and methods of diagnosis; Column B, patients' data and some features of the diagnosed lesions; C, risk and some etiological features for development of the lesions.

S/n	Diagnosed lesion(s) A	Patient's data and features of the diagnosed lesion(s) B	Risk/aetiological factors for development of lesion(s) C
1	(i) Juxta-cervical vesicovaginal fistula (ii) Diagnostic Methods: Clinical Assessments, Dye test / Examination under anesthesia (EUA), and (iii)Intravenous urography (IVU)	Age of patient: 25 years Parity: Para 2; Presenting complaints: Passage of urine through the vaginal for 2 weeks after emergency lower segment Cesarean section (EMLCS). The patient had a previous EMLCS in her first delivery.	(i) This patient had previous EMLCS but attempted spontaneous vaginal delivery (SVD) of the last child and had prolonged obstructed labor. (Ii) Prolonged obstructed labor (POL). Labor lasted 30hours before EMLCS (iii) Big baby (Birth weight 4.2kg) (iv) Prolonged urethral catheterization + UTI (v) EMLCS for the last child birth.
2	Diagnosis: Third degree (30) Uterovaginal Prolapse	Age of patient, 31 years; Parity, Para 0+0 ; Presenting complaints: (i)Protrusion from the vulva and vagina of 4 years duration (ii) Difficulty in passing urine (iii) She was alleged to have been raped at the same time by a gang of 3 men in her community prior to the development of vulva-vaginal lesion (iv) Lifting heavy weights in her farm at her community (v) She had difficulty in passing urine	(i)Simultaneous sexual battery by a gang of three (3) men. (ii) Post traumatic urethral stricture disease with chronic urinary retention, and bladder outlet obstruction (iii) Lifting of heavy weights in her farm at home.
3	Diagnosis: (i)Uterocutaneous fistula, with surgical site/subcutaneous endometriosis (ii) Bulky uterus with uterine fibroids (iii) Right ovarian cyst with septations (iv) Ruptured endocervical polyps	Age of patient, 31 years; body weight 113kg Height, 1.68m; body mass index (BMI) = 40.04kg/m^2. She was a known hypertensive with obesity. She had myomectomy in a hospital in another region of Nigeria. She was discharged 10days after operation. There was wound breakdown 2 months after surgery. She developed cyclical bleeding at the wound site, occurring with menstruation for 4 years prior to presentation at UPTH. Comorbidities were peptic ulcer disease, and hypertension	(i)Grade 3 obesity (morbid obesity) (ii) Hypertension (iii) Wound infection with healing by secondary intention (iv) Wound dehiscence with extrusion of suture (stitches) materials (v) Probable epithelialization of fistulous tract from the uterine endometrium to the abdominal wall.
4	Diagnosis: Rectovaginal fistula with 4th degree perineal tear	Patient's personal data: Age 32years. She was primiparous with height 1.71m; body weight 85kg; BMI, 29.07kg/m^2; and haemoglobin genotype AA. She was primiparous with her pregnancy supervised at a cottage hospital. Delivery was supervised at the maternity home of a traditional birth attendant (TBA). Labor	(i)This patient was over-weight (ii) Elderly primiparous mother having antenatal care at a cottage hospital with limited facilities. (iii) Primiparous mother having child delivery at a traditional birth attendant's (TBA) maternity home.

		lasted more than 16 hours. At second stage of labor the TBA gave an extensive midline episiotomy. Advancing head of the baby converted the midline episiotomy a 4th degree perineal tear. Birth weight of baby was 3.5kg. She had pelvic sepsis HVS (M. C. S) had heavy growth Klebsiella. The fistula was successfully repaired.	(iv) Wrong siting of episiotomy by TBA (v) Puerperal sepsis (with Klepsiella species) (vi)Fairly big baby, birth weight of 3.5kg.
5	Diagnosis: Utero vesical fistula (with cyclical menouria) she had both vaginal bleeding and haematuria during each menstruation Diagnosis: Clinical Assessment + Hysterosalpingography and intra-operative findings Finding at surgery Two polyamide (Nylon©) stiches were used to approximate the anterior wall of the uterus to the posterior wall of the urinary bladder. A fistulous tract formed along each of these stitches to between the two organs.	Patient age, 32 years; height 1.59m; weight 103kg; body mass index 40.74kg/m2. Presenting complaint- Passing blood in urine during menstruation for previous 1year. She had menouria every 2-3days in a 25-to-28-day cycle. She had POL with ruptured uterus and intrauterine fetal death (IUFD) at a peripheral hospital. She then had emergency exploratory laparotomy + repair of ruptured uterus at the same hospital. Cyclical menouria started 3 months after this surgery.	(i)Gross obesity, body mass index (BMI) 40.74kg/m^2 (ii) POL (iii) Intrauterine fetal death (IUFD) (iv) The use of non-absorbable sutures to repair the uterine rupture. (v) Approximation of the posterior wall of the urinary bladder to the anterior wall of uterus. (vi) Probably there was tension and ischemia at the points of application of the stitches. (vii) Probable cystitis and endometrial infections.
6	Diagnosis: (i)Third degree utero vaginal prolapse (ii) Uterine fibroids diagnostic methods (i) Clinical assessment (ii) Transvaginal ultrasonography: Major finding was urinary bladder distension with urine.	(i)Age of patient, 55 years. (ii) Parity, para 3^{+7}. She complained of a protrusion from her vulva and vagina for 4 years before presentation. (iii) She had terminations of pregnancies seven (7) different times in a private clinic. Methods of termination of pregnancy (TOP) was dilatation and curettage (D and C). Comorbidities- (i)Uncontrolled hypertension (ii) Pelvic inflammatory disease	(i)Multi-parity (ii) Chronic retention of urine. Difficulty in passing urine (iii) Uterine scaring and diminished contractility due to frequent D and Cs, and injury to the myometrium
7	Diagnosis: Second-to-third degree uterovaginal prolapse with ulceration of the uterus.	(i)Age 45 years; Para 4 (ii) Occupation- trading; Complaints at presentation were protrusion from her vulva and vagina for past 7 years and continuous vaginal bleeding for 4 months. Both started after her last childbirth. History of previous deliveries (i) In the first delivery, she had difficult vaginal delivery (SVD) with extensive perineal tear (ii) In second delivery, baby was macrosomic.	(i)Difficult vaginal deliveries with extensive perineal laceration (ii) SVD which was problematic; baby was macrosomic (iii) Fourth delivery was difficult; she had series of fundal pressures to aid delivery. (iv) She had history of difficulty in micturition due to bladder outlet obstruction by the prolapsed organs. (v) Birth weights of her previous babies 3.0kg; 4.6kg; 3.6kg and 3.5kg. All deliveries were difficult SVDs
8	Diagnosis:	(i)Age of patient, 68 years; Her presenting complaint was protrusion from the vagina for 6 months before presentation.	(i)All her pregnancies were unsupervised

	(i)Utero vaginal prolapse (ii) Chronic retention of urine (iii) Atrophic vulva	(ii) Parity: - Para 10^{+0} (6 alive) (iii) Level of education was primary (iv) She was more than 10 years post-menopausal (v) Comorbidity, hypertension	(ii) She had her first 6 pregnancies and SVDs before the age of 20 years.
9	Diagnosis: (i)Rectovaginal fistula (ii) Rectouterine fistula (iii) Advanced anorectal carcinoma Methods of diagnosis: (i)Clinical assessment (ii)Abdominopelvic ultrasonography (iii)Proctosigmoidoscopy with biopsy and histology (iv) Abdominal CT Scan (v) Tumour marker:- carcinoembryonic antigen + hepatic enzyme studies	(i)Patient's Age, 40 years (ii) Level of education- secondary (iii) Occupation: business (iv) Parity- Para 0^{+2} (v) Presenting complaints: (i) Abdominal pain for two weeks (ii) Continuous vaginal bleeding for 6 months (iii) Passage of blood and stool through the vagina for 6 months Features on Examination (i)Fleshy mass in the rectum (ii) Fistulous tract at the posterior vaginal wall (iii) Cauliflower mass at the anal orifice spanning about half of the anal canal; mass was hard and very tender.	(i)Advanced (metastatic) anorectal carcinoma with metastasis to the liver (ii)Massive hepatomegaly
10	Diagnosis: Vesicovaginal fistula. Position; Juxta-cervical. Diagnostic methods EUA + methylene blue dye test, Intravenous urography + cystography.	Age of patient 33 years; Parity, Para $3+^{6}$, Occupation, Farming; Presenting compliant: - Continuous passage of urine through the vagina for 10 months after her last childbirth. Last childbirth: Pregnancy was supervised at a health centre in her village. Delivery was in a church. It was a SVD. Labour was prolonged and complicated by UTI. Previous deliveries: (i)First delivery EMLCS for prolonged obstructed labour (POL) (ii) Second delivery – EMLCS for POL (iii) Previous 6 times of D and C.	(i)History of previous multiple terminations of pregnancy by dilatation and curettage (D+C) (ii) Supervision of pregnancy (antenatal care) at a health centre, usually without manpower for specialized care after previous caesarean deliveries (iii) Trial of labour in a multiparous mother with two previous caesarean sections (iv) Delivery in a church with no facilities management of high risk pregnancies. (v) Prolonged labour (vi) Urinary tract infection.
11	Diagnosis: Juxta-cervical vesico-vaginal fistula	Age, 35 years; body weight, 62kg; Level of education- secondary; Parity- Para $3^{+0,}$ Presenting complaints- Leakage of urine through the vagina for 4 years after last childbirth. Last pregnancy/ + childbirth: (i)Pregnancy was not supervised It was, however, carried to term. (ii) Delivery was in a church; labour was prolonged and lasted 3 days. Baby was a fresh stillborn (male) (iii) Multiple vaginal examinations were done in the course of labour. (iv) Leakage of urine through vagina was an early complication	(i)Poor obstetric history but delivery taken in a church (ii) Prolonged obstructed labour (POL) (iii) Multiple vaginal examinations in the church + UTI culture yielded Pseudomonas species. (iv) Labour lasted 3 days with no intervention

		Previous pregnancies/delivery: (I)First pregnancy was unsupervised. She had POL, baby died under 5 years of age. (ii) Second pregnancy: Child birth was by SVD. She had POL. The baby was a macerated stillborn.	
12	Diagnosis: Juxta cervical vesicovaginal fistula (uterovesical) fistula with extension to the cervix. Methods of diagnosis: Clinical assessment + EUA/methylene blue dye test + Hysterosalpingography	Age, 36 years; Parity- Para 2^{+1}, Level of education- tertiary. Complaints: Leakage of urine through the vagina for 3 years 7months after her last childbirth. Her last pregnancy/childbirth: (i)Antenatal care was in a private clinic (ii) Pregnancy was term; labour lasted more than 24 hours (iii) Emergency lower segment caesarean section (EMLCS) was done (iv) Birth weight of baby was 3.8kg Previous pregnancies: (i)She had spontaneous abortion at 6 weeks (ii) First pregnancy was carried to term (iii) She had POL (iv) EMLCS was done, indicated by the POL (v) Baby was born live with birth weight 4. 6kg (vi) She had UTI with heavy growth of Pseudomonas species.	(i)Trial of SVD after a previous EMLCS (ii) Prolonged obstructed labour (iii) Big baby – birth 3.8kg second pregnancy and 4.6kg first pregnancy (iv) Emergency caesarean section

UTI, urinary tract infection; M.C.S, microscopy culture and sensitivity; HVS, high vaginal swab; CT scan, computerized axial tomographic scan

4. Discussion

Many urogenital and anorectal lesions are preventable, yet a simple solution is difficult to achieve when providing health care for a mixed population of diverse cultures [4]. Also most women seek local treatment and do not seek specialist advice either due to negligence or because of a lack of transport or financial resources as reported in a different study [1]. Fistulas of the lower urinary tract are uncommon conditions that may occur spontaneously or after therapy in patients with various pelvic abnormalities. However, fistulas were the most commonly encountered lesions in this study. When present, fistulas are associated with fecal or urine leakage, depending on the type. Victims often have offensive smells which are often socially distressing and may constitute hygienic problems for the patient [4, 5]. Unfortunately, factors that lead to the formation of lower urinary tract fistulas often increase their complexity and often make surgical decision for repair difficult.

In our study, the etiological factors of major lower genitourinary and rectovaginal were majorly from obstetric origin. Prolonged and obstructed labor were the most common indications for emergency Cesarean sections, or assisted instrumental deliveries. Both Cesarean section and instrumental deliveries could cause fistula formation. This finding is similar to what was also found elsewhere [6, 7].

Clinical presentation depends on the type of lesion. Patients with vesicovaginal fistulas presented mostly with complaints of leakage of urine. Those with vesicouterine fistula, in addition to vaginal leakage of urine, also complained of passing of blood in urine which was cyclical. Other complaints in which these patients presented with include vulvar dermatitis and urinary tract infections. Other manifestations of lower urinary tract fistula include faecouria, pneumaturia, flank pain, paralytic ileus amongst others [8, 9].

Two broad categories of risk and etiological factors (modifiable and non-modifiable) were identified from records of patients' histories, physical examinations, and laboratory investigations (column C, Table 1). The modifiable risk or etiological factors include the following: Antenatal care and childbirth at primary healthcare centers by nulliparous pregnant mothers, and pregnant mother with previous cesarean section(s); childbirth at religious houses and traditional

birth attendants' maternity homes that had no capacity and facilities for specialist obstetric services. Others include the trial of spontaneous vaginal delivery (SVD) in patients with a history of multiple terminations of pregnancy (dilatation and curettage), as observed in two of the patients, and mothers with previous cesarean section(s). It is known that some women who have had previous Cesarean sections would prefer a planned mode of spontaneous vaginal delivery, just as some clinicians advocate the same practice of trial of SVD after a previous caesarean sections in places with very high caesarean section rates [10]. However, such planned vaginal delivery should be in hospitals with capacity and competencies for active management of labor and its complications.

The use of non-absorbable sutures in the repair of a ruptured uterus, and the approximation of the contiguous walls of both organs with this sutures should have been avoided. The accompanying granulomata were exposed to the endometrium and the mucous membranes of the urinary bladder. In the urinary bladder they could form nidi for nucleation and formation of bladder calculi, or provide surfaces for the formation of biofilms. Biofilms are structured colonies of pathogens and their mucoid products. From these colonies infective agents are dissipated into the stored urine in the urinary bladder, with the formation of recurrent or persistent urinary tract infections [11]. In the uterine cavity, the non-absorbable sutures could form foci of chronic endometritis and endometrial calcifications.

The oldest of these patients was aged 68 years. Of the twelve patients she had a rather typical and peculiar exposure to events that probably resulted in her development of utero-vaginal prolapse. For instance, she was more than 10 years post-menopausal at the time of her treatment at UPTH. She was grand multiparous. She had vaginal delivery of all her 10-pregnancies. The first 6 of her pregnancies and deliveries were before the age of 19 years. This suggests that she had all the first six pregnancies during her adolescence, a period usually characterized by rapid sexual growth and maturation. These could theoretically explain her pelvic floor weakness and genital prolapse. At presentation, she had grade 3 hypertension, perhaps a complication of her prolapsed genitalia, and in addition developed an acute on–chronic urinary retention. The mass of prolapsed uterus and vagina got obstructed at the vulva, was irreducible and compressed the urethra with resultant obstruction of the urinary bladder outlet. She was managed by emergency urethral catheterization and continuous bladder drainage. She had post obstructive diuresis which was mild and responded to a combination of intravenous normal saline fluid replacement, oral fluid intake with close monitoring. Perhaps a more sinister presentation in this patient was her development of vulvar dermatitis, fecal contamination of the vulva and the vagina, and Gram negative bacterial endometritis. Culture of endocervical mucus grew pseudomonas species which responded to treatment with ceftazidime.

Although the most common factors responsible for lesions in the patients were obstetric, insecurity, iatrogenic factors and anorectal malignancy were some of the risk and etiological factors that underpinned the development of urogenital and anorectal lesions in the patients. Insecurity was involved with the case of the patient who was alleged to have been raped simultaneously by a gang of three men in her community, as a result of which she developed post-traumatic urethral stricture with retention of urine.

The fate of these women and complications they had suggest that there should be proper definition of the obstetric services and professional responsibilities to be available at the primary health centers. There should be clear service guidelines and proper supervision of the healthcare personnel at this level, especially the prompt diagnosis and appropriate referral of mothers with risky and high-risk pregnancies. Most of the patients developed these complications before they reported to our tertiary hospital. The findings of this study seems to justify the fears about the patronage of public health facilities by pregnant mothers. These difficulties, which in many communities led to the underutilization of government health facilities by pregnant mothers, include long distances from their homes to health facilities, bad roads, lack of ambulance services, and insecurity [12-16]. Others include alleged incompetence and rudeness of some healthcare providers, high cost and poor quality of healthcare services with poor facilities and infrastructure [17- 21]

This classification (as modifiable and non-modifiable risk and etiological factors) was adopted because it was considered that most of the urogenital and rectovaginal lesions were preventable. Modifiable factors are factors which can be reversed by appropriate combinations of primary, secondary or other preventive measures. These measures should involve voluntary participation of the population, religious leaders, healthcare practitioners, and the government. The aim should be to effect appropriate health-promoting behavior changes towards achievement of safe pregnancy, delivery, and a normal puerperium. The government should address the fears that have been associated with underutilization of government healthcare institutions by pregnant mothers. This should include capacity-building and improving the competencies of staff of healthcare institutions. Each primary healthcare center should be headed by a medical practitioner with good experience. The information gaps that probably gave rise to inefficient services at the primary and secondary healthcare levels can be bridged by regular seminars and workshops to be organized at the tertiary centers for all relevant clinical staff of well-defined service area units. The service area unit should comprise primary, secondary and tertiary healthcare centers and their support institutions. A multidisciplinary team including the urologists, obstetricians and gynecologists and general surgeons, and physicians should monitor implementation of guidelines at the primary and secondary healthcare centers [22].

Surgical management of lower urinary tract fistula depends on the type, site of fistula, skill and experience of surgeon, logistic support, and the operative technique. This has been largely successful in our institution. However, preoperative patient preparation including patient history and clinical evaluation, anesthesia, surgery and postoperative care are often extensive and may have enormous costs and distress to the patients and the clinicians. This study has shown that most of the risk and etiological factors are modifiable, and that preventive efforts may be successful.

Conclusion and recommendations: Lower urogenital tract fistulas and major urogenital lesions are a major problem in our region with obstetric trauma a leading cause. Despite high success in treatment rates, prevention still plays a vital role. However, lack of adequate access to good quality of healthcare services contribute to the development of new fistula cases. There is a lack of reliable data on how to develop and implement rehabilitative programs for women who suffer from genitourinary and rectovaginal lesions.

In this study, fistulas were more common than other lesions. It is pertinent to mention that the development of partnerships between non-governmental organizations and tertiary medical institutions, and more academic interactions between primary, secondary and tertiary may help to alleviate this problem. These partnerships could improve the care given to fistula patients and reduce the burden on the health system as well as stimulate fistula initiatives, and maternal healthcare initiatives. Emphasis of any initiative should be on prevention as this will obviate the high burden of morbidity, physical, psychosocial complications and high cost of evaluation and treatment that may be associated with these lesions.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest.

Statement of ethical approval

The present research work does not contain any studies performed on animals/human subjects by any of the authors. However, ethical approval was obtained from the University of Port Harcourt Teaching Hospital Ethics Committee prior to commencement of this study.

Statement of informed consent

Informed consent was obtained from all individuals participants included in this study.

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