

ETIOLOGICAL SPECTRUM OF IATROGENIC UROGENITAL FISTULA IN PATIENTS PRESENTING TO TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Iatrogenic urogenital fistula is a serious and preventable complication of gynecological and obstetric procedures, leading to significant physical, psychological, and social consequences. Understanding its etiological spectrum is essential for improving surgical safety and patient outcomes. **Objective:** To assess the etiological spectrum of iatrogenic urogenital fistula at a tertiary care hospital. **Study Design:** Cross-sectional observational study. **Setting:** Department of Obstetrics & Gynaecology, Hayatabad Medical Complex, Peshawar, Pakistan. **Duration of Study:** From March 2025 to September 2025. **Methods:** Eighty patients aged 18–45 years with a confirmed diagnosis of iatrogenic urogenital fistula were included. Data were collected using a structured pro forma that documented age, BMI, socioeconomic status, occupation, education level, and residence. The etiology of the fistula was recorded for each patient. Diagnosis was confirmed through examination under anesthesia and cystoscopy. Statistical analysis, including assessment of associations between etiology and patient characteristics, was performed using appropriate tests with a significance threshold of $P < 0.05$. **Results:** The mean age of patients was 33.08 ± 7.94 years, and the mean BMI was 24.64 ± 2.06 kg/m². Abdominal hysterectomy was the leading cause of fistula, identified in 29 cases (36.2%), followed by cesarean section in a scarred uterus in 24 cases (30.0%), hysterectomy performed for postpartum hemorrhage in 10 cases (12.5%), cesarean section in an unscarred uterus in 12 cases (15.0%), and dilatation and curettage in 5 cases (6.2%). A significant association was observed between etiology and age ($P < 0.001$), with abdominal hysterectomy more common in older patients and cesarean-related etiologies more common among younger women. **Conclusion:** Abdominal hysterectomy and cesarean section—particularly in previously scarred uteri—were the most common causes of iatrogenic urogenital fistula. Abdominal hysterectomy was associated with older age, whereas cesarean-related causes were more common among younger patients. Improved surgical training and perioperative vigilance may help reduce the incidence of this preventable condition.

Keywords: Iatrogenic Urogenital Fistula, Vesicovaginal Fistula, Surgical Injury, Cesarean Section, Abdominal Hysterectomy

INTRODUCTION

Urogenital fistula (UF) constitutes an alarming health issue for women, resulting in considerable impairment in society (1). Nearly 30,000 new cases are projected worldwide each year (2). In Pakistan, roughly 3,500 instances of obstetric fistula are reported every year (3). Furthermore, the incidence of UF among women of reproductive age within South Asia was recently identified as 1.60 out of 1000 women (4). The precise estimation of fistula incidence remains challenging due to insufficient reporting and the reluctance among those affected to disclose their condition. Reports suggest that low-resource countries exhibit a higher rate of UF than high-resource countries. However, a significant change has been observed in the cause of female UF, contrary to the previous trend (5).

Recent studies indicate a rising incidence of iatrogenic fistula. Studies demonstrate that 80.2% of iatrogenic fistulas occur due to surgical interventions for obstetric complications, which include cesarean sections or hysterectomies. Evidence is accumulating concerning the high incidence of iatrogenic fistulas within repaired fistulas, even though definitions may vary. Based on our conceptual classification, it was reported that 13.2% of fistulas in a sample of 5959 women were found to be of an iatrogenic nature (6, 7).

Research supported by USAID indicated that iatrogenic injury accounts for 18% of fistulas in instances where the surgeon identified etiology (8). Initially, the burden was mainly attributed to obstetrical fistulae; nevertheless, recent studies have shown an increase in iatrogenic fistulae (9). The development of conservative methods to treat gynecological diseases, such as non-surgical or minimally invasive procedures, has been recognized as a primary concern due to

limited experience, leading to a spike in iatrogenic fistula formation (10).

Iatrogenic urogenital fistula remains a significant cause of morbidity, particularly in developing countries where limited surgical expertise and delayed recognition of intraoperative complications increase its burden. Understanding the etiological spectrum of iatrogenic urogenital fistula is crucial for identifying high-risk procedures and guiding training programs to minimize avoidable injuries. A comprehensive evaluation of causative factors provides insights into regional and institutional variations, thereby helping policymakers and healthcare providers develop targeted prevention and management strategies.

METHODOLOGY

This cross-sectional study was conducted in the Obstetrics & Gynaecology Department of Hayatabad Medical Complex from March 2025 to September 2025, after taking ethical approval from the hospital. We enrolled 80 patients in this study, aged 18 to 45 years, presenting with urogenital fistula with a clear iatrogenic origin, the fistula developed as a direct complication of a surgical procedure. Patients were excluded if their fistula was determined to be a result of obstructed labor, advanced pelvic malignancy, or radiation therapy. Upon enrollment, each gave their consent. Data collection was performed using a pre-designed, structured pro forma, in which we recorded the patients' demographic profile, including age, BMI, residence, education status, economic status, and occupational status. The diagnosis of a urogenital fistula and its anatomical classification were confirmed for patients through a detailed history and physical

examination, followed by an examination under anesthesia. Diagnostic cystoscopy was performed to observe the interior of the bladder and locate any fistulous openings. The etiologies of urogenital fistulas were assessed for every patient, which included abdominal hysterectomy, cesarean section in a uterus with a prior scar or unscarred, hysterectomy performed for postpartum hemorrhage, and procedures involving dilatation and curettage of the uterus.

Data was analyzed using SPSS 26. The Chi-square test was used to assess the relationship between etiology and age, with P values set to ≤ 0.05 .

RESULTS

The mean age of 80 patients was 33.08 ± 7.94 years, and their mean Body Mass Index (BMI) was 24.64 ± 2.06 kg/m². Table 1 presents the demographic characteristics of the patients.

The analysis of etiology for iatrogenic urogenital fistula showed that abdominal hysterectomy performed for gynecological indications was the most common etiology in 29 cases (36.2%). This was followed by cesarean section in women with a previously scarred uterus, which was 24 cases (30.0%). Hysterectomy done for postpartum hemorrhage was the cause in 10 cases (12.5%), while primary cesarean section in an unscarred uterus led to fistula formation in 12 women (15.0%). A smaller number of cases, 5 (6.2%), were due to procedures involving dilatation and curettage (Table 2).

A significant relationship was observed between the type of iatrogenic injury and the patient's age group. The vast majority of fistulas after abdominal hysterectomy (24, 82.8%) occurred in cases over the age of 35 years. Fistulas resulting from other procedures were primarily found in younger women aged 18 to 35 years ($P < 0.001$) (Table 3).

Table 1: Demographic characteristics of the patients

Demographic characteristics		n	%
Socioeconomic status	Low	19	23.8%
	Middle	45	56.2%
	High	16	20.0%
Education status	Educated	37	46.2%
	Uneducated	43	53.8%
Residence	Rural	33	41.2%
	Urban	47	58.8%
Occupation	Job	29	36.2%
	Housewife	51	63.8%

Table 2: Etiology of Iatrogenic urogenital fistula

Etiology of Iatrogenic urogenital fistula	n	%
Hysterectomy (Abdominal)	29	36.2%
C-section previous scar	24	30.0%
Hysterectomy (PPH)	10	12.5%
Dilatation & curettage	5	6.2%
C-section (Unscarred)	12	15.0%

Table 3: Association of Etiology of Iatrogenic urogenital fistula with age

Etiology of Iatrogenic urogenital fistula	Age distribution (Years)				P value
	18 to 35		> 35		
	n	%	n	%	
Hysterectomy (Abdominal)	5	17.2%	24	82.8%	< 0.001
C-section previous scar	22	91.7%	2	8.3%	
Hysterectomy (PPH)	9	90.0%	1	10.0%	
Dilatation & curettage	5	100.0%	0	0.0%	
C-section (Unscarred)	11	91.7%	1	8.3%	

DISCUSSION

The mean age of our patients was 33.08 years, placing our patient population within a broader age range. This average is consistent with Raassen et al., who noted that women with fistulas of obstetric origin, such as those following cesarean section, were significantly younger (mean 28.6 years) than those with fistulas from gynecological procedures like hysterectomy, who had a mean age of 41.9 years, and the mean age of 31.6 years reported by Tasnim et al (6, 9).

The socio-demographic profile of our patients reveals that the majority had a middle socioeconomic background and resided in urban areas. This is a noteworthy finding, as it challenges the traditional paradigm that exclusively links fistula with profound poverty and remote rural isolation. While obstructed labor fistulas are indeed concentrated among the most marginalized, our results suggest that iatrogenic injuries affect a broader cross-section of society, including urban women who have access to but may be receiving suboptimal surgical care. This is affirmed by Srichand et al., who observed a rising trend of iatrogenic fistula in Pakistan and implicated suboptimal care as a key driver. Furthermore, the high proportion of homemakers in our study indicates that this condition predominantly affects women within the domestic sphere, with profound implications for their familial and social roles.

Regarding etiology, abdominal hysterectomy was the leading cause, accounting for over a third of all cases. This finding aligns with the results of Srichand et al., in which abdominal hysterectomy was the predominant cause, rising to a striking 76% in their later study period.¹¹ Similarly, Tasnim et al. identified hysterectomy for non-

obstetric reasons as the most common etiology, accounting for 52.5% of their iatrogenic cases (9). The high frequency of this specific cause points directly to technical challenges and potential gaps in surgical training or decision-making during routine gynecological procedures. The second most common cause in our study was cesarean section in women with a previous uterine scar, constituting 30% of cases. This is a significant and consistently identified risk factor. Raassen et al. found that 40% all women with iatrogenic fistulas had a history of previous laparotomy, almost always a cesarean section, and this was a significant risk factor for vesicovaginal fistulas (6). Osman et al., in their study from Saudi Arabia, reported that a staggering 80% of their cesarean-related fistulas occurred in repeat procedures, highlighting the heightened surgical difficulty and risk of urinary tract injury in the presence of pelvic adhesions and altered anatomy from prior surgery (12).

A statistically significant relationship was observed when we cross-tabulated fistula etiology with patient age. The vast majority of fistulas caused by abdominal hysterectomy, 82.8%, occurred in women over the age of 35. Conversely, fistulas resulting from cesarean sections (both in scarred and unscarred uteri) and hysterectomies for postpartum hemorrhage were prevalent in younger women aged 18 to 35. This illustrates the two primary pathways to iatrogenic injury identified in the literature. The first pathway affects older women undergoing elective or planned gynecological surgeries (13-15). The second pathway affects younger women during obstetric care (16-17). This pattern underscores the need for tailored preventive strategies that address the distinct risks in both obstetric and gynecological surgical domains.

We recommend that there is an urgent need to enhance surgical training and supervision, particularly for procedures like abdominal hysterectomy and repeat cesarean sections. Implementing structured training modules focused on careful dissection of the bladder, especially in the presence of adhesions from prior surgery, is crucial. Secondly, the high rate of fistula following repeat cesarean section calls for a critical re-evaluation of obstetric practices. Promoting and supporting vaginal birth after a previous cesarean section, when clinically appropriate, could help reduce the risk associated with multiple abdominal surgeries.

CONCLUSION

In conclusion, our study identified abdominal hysterectomy and C-section with a previous scar, followed by unscarred C-section, as the leading causes of iatrogenic fistula. We found that abdominal hysterectomy was associated with older age, and C-section-related etiologies were more common in younger age.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned.

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

KARISHMA ALAM (Trainee Medical Officer)

Manuscript drafting.

Final approval of manuscript.

MUSADDIF RIAZ (Trainee Medical Officer)

Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, and final approval of manuscript.

Conception of Study.

LUBNA BIBI (Trainee Medical Officer)

Manuscript revisions, critical input.

SAIMA KHATOON (Trainee Medical Officer)

Study Design, Review of Literature.

JAWAIRIA (Trainee Medical Officer)

Data entry, data analysis, and article drafting.

REFERENCES

1. Saeed S, Nawaz N, Murtaza B, Mahmood A. Urogenital fistula in females: a four-year experience. *Pak Armed Forces Med J.* 2016;66(3):361-6. (No DOI available.)
2. Hilton P. Urogenital fistula in the UK: a personal case series managed over 25 years. *BJU Int.* 2012;110(1):102-10. <https://doi.org/10.1111/j.1464-410X.2011.10630.x>
3. United Nations. One UN Pakistan: annual report 2014. Islamabad: United Nations; 2015 [cited 2025 Sep 20]. Available from: http://www.un.org.pk/wp-content/uploads/2015/12/2014-UN-Pakistan-Report_web1.pdf (No DOI available.)

4. Adler AJ, Ronsmans C, Calvert C, Filippi V. Estimating the prevalence of obstetric fistula: a systematic review and meta-analysis. *BMC Pregnancy Childbirth.* 2013;13:246. <https://doi.org/10.1186/1471-2393-13-246>
5. Ngongo CJ, Raassen TJIP, Mahendeka M, Lombard L, Van Roosmalen J, Temmerman M. A retrospective review of genital fistula occurrence in nine African countries. *BMC Pregnancy Childbirth.* 2022;22(1):744. <https://doi.org/10.1186/s12884-022-05051-w>
6. Raassen TJIP, Ngongo CJ, Mahendeka MM. Iatrogenic genitourinary fistula: an 18-year retrospective review of 805 injuries. *Int Urogynecol J.* 2014;25(12):1699-706. <https://doi.org/10.1007/s00192-014-2445-3>
7. Mpunga Mafu M, Banze DF, Nembunzu D, Maroyi R, Paluku J, Kinja R, et al. Frequency and management of non-obstetric fistula in the Democratic Republic of Congo: experience from the Fistula Care Plus project. *Trop Med Int Health.* 2020;25(6):687-94. <https://doi.org/10.1111/tmi.13394>
8. Tripathi V. Iatrogenic fistula and cesarean section safety in low resource settings: ensuring quality in a context of rapidly increasing volume. Abuja: West African College of Surgeons Annual General Meeting and Scientific Conference; 2020. (No DOI available.)
9. Tasnim N, Bangash K, Amin O, Luqman S, Hina H. Rising trends in iatrogenic urogenital fistula: a new challenge. *Int J Gynaecol Obstet.* 2020;148(Suppl 1):33-6. <https://doi.org/10.1002/ijgo.13037>
10. Hilton P. Trends in the aetiology of urogenital fistula: a case of retrogressive evolution. *Int Urogynecol J.* 2016;27(6):831-7. <https://doi.org/10.1007/s00192-015-2919-y>
11. Srichand P, Hassan N, Shaikh N, Sultana F, Talpur Z, Farheen G. Aetiological pattern of iatrogenic urological fistula: is the scenario changing? *J Soc Obstet Gynaecol Pak.* 2021;11(4):234-7. (No DOI available.)
12. Osman SA, Al Badr AH, Malabarey OT, Dawood AM, AlMosaieed BN, Risk DEE. Causes and management of urogenital fistulas: a retrospective cohort study from a tertiary referral center in Saudi Arabia. *Saudi Med J.* 2018;39(4):373-8. <https://doi.org/10.15537/smj.2018.4.21515>
13. Obarisiagbon EO, Olagbuji BN, Onuora VC, Oguike TC, Ande AB. Iatrogenic urological injuries complicating obstetric and gynaecological procedures. *Singapore Med J.* 2011;52(10):738-41. (No DOI available.)
14. Mathevet P, Valencia P, Cousin C, Mellier G, Dargent D. Operative injuries during vaginal hysterectomy. *Eur J Obstet Gynecol Reprod Biol.* 2001;97(1):71-5. [https://doi.org/10.1016/S0301-2115\(00\)00484-X](https://doi.org/10.1016/S0301-2115(00)00484-X)
15. Mteta KA, Mwambo J, Mvungi M. Iatrogenic ureteric and bladder injuries in obstetric and gynaecologic surgeries. *East Afr Med J.* 2006;83(2):79-85. <https://doi.org/10.4314/eamj.v83i2.9392>
16. Zheng AX, Anderson FW. Obstetric fistula in low-income countries. *Int J Gynaecol Obstet.* 2009;104(2):85-9. <https://doi.org/10.1016/j.ijgo.2008.09.011>
17. Hawkins L, Spitzer RF, Christoffersen Deb A, Leah J, Mabeya H. Characteristics and surgical success of patients presenting for repair of obstetric fistula in western Kenya. *Int J Gynaecol Obstet.* 2013;120(2):178-82. <https://doi.org/10.1016/j.ijgo.2012.08.014>



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