

# Prevalence, Management and Outcomes of Enterocutaneous Fistulas in Buea Regional Hospital and Laquintinie Hospital of Douala. A Five Years Retrospective Study

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## Abstract

**Background:** An Enterocutaneous fistula (ECF) is an abnormal connection between the intestinal tracts or stomach and the skin. They are a major catastrophe to the patient and surgeons and still have a high incidence of morbidity and mortality which varies between 6% - 33%; their management remains a big challenge. These patients frequently face complications, and a well-organized multidisciplinary approach must be implemented in their management to improve outcomes. **Objectives:** Our study aims to assess the prevalence, management and outcomes of enterocutaneous fistulas in Buea regional hospital and Laquintinie hospital of Douala over the past 5 years. **Methods:** This was a hospital-based retrospective study in Buea regional hospital and Laquintinie hospital of Douala. Records of patients who had enterocutaneous fistulas within the period of 1<sup>st</sup> January 2017 to 31<sup>st</sup> December 2020 in the surgical departments. Data included demographics, pre-operative diagnosis, comorbidities, type of fistula, management modality and means, the indication of operative treatment, length of stay in the hospital and outcomes. Data was analysed using SPSSv26. **Results:** The study constituted 1343 medical records of which 83 medical records of patients with enterocutaneous fistulas, giving a prevalence of 6.2%, female predominance at 59% (n = 49), 42.2% (n

= 35) were referred cases from the periphery for better management. A vast majority (96.4%) occurred as post-operative complications with appendectomy the most common indication (18.8%). High output fistulas were predominant (43.4%). 59% (n = 47) were managed medically, 6% (n = 5) received both conservative and surgical modalities while 35% (n = 5) were managed surgically. 64.1% (n = 50) were placed on enteral nutrition while 35.9% (n = 28) were placed on parenteral nutrition. Peritonitis/infection 50% (n = 18) was the commonest indication of surgical treatment, followed by failure of medical treatment 25% (n = 9) then high output fistulas 16.7% (n = 6). Resection with end-to-end anastomosis was the preferred repaired work at 61% (n = 22). The mortality rate was 38.5% (n = 32), 29% (n = 24) healed after conservative treatment, 21.7% (n = 18) healed after surgery, 7.2% (n = 6) persisted after surgery while 3.6% (n = 3) persisted after conservative treatment. Anaemia, sepsis, electrolyte imbalance, dehydration and malnutrition were the commonest complications. **Conclusion:** The prevalence of enterocutaneous fistulas was high, with a female predominance and a mean age of 38 years. Most cases were seen as a referral from the periphery for better management. The greatest majority of fistulas occurred as a postoperative complications. Conservative management with enteral feedings was preferred, they had better outcomes and gave more chances of healing. The commonest indication of surgical treatment was an infection. Resection with end-to-end anastomosis was the preferred repaired work. The mortality rate was high, and anaemia, sepsis and electrolyte imbalance were the commonest complications.

## Keywords

Enterocutaneous Fistula, Prevalence, Management, Outcomes

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## 1. Introduction

A fistulae is an abnormal communication between two body parts [1]. An enterocutaneous is an abnormal communication between the intestinal tract or stomach and the skin with its content usually leaking out [1]. It's the most common type and represents 88% of all fistulas [2]. Most occur after bowel surgery, others occur secondary to injury or trauma such as stab wounds, gunshots or Road Traffic Accident. They can also occur as a result of infections and inflammatory bowel diseases such as chron's disease or ulcerative colitis. ECF are a major catastrophe to the patient and surgeons; and still has a high incidence of morbidity and mortality which varies between 6% - 33% [3]. Enterocutaneous fistulae are one of the most devastating complications to develop in the general surgical patient. It is a major problem for both the surgeon and the patient, and they affect the quality of life. Mortality rates vary from 6% to 33% with associated morbidity and complications very significant [2], making it a public health issue. Added to that, there's absence of health personnel in some health areas since most cases of ECF seen in secondary hospitals come as referral from peripheries.

A study done by Quinn M *et al.* showed that 89.1% of ECF developed after abdominal surgery, 6.88% spontaneously and 3.99% following endoscopic procedures [4]. In Spain, in the study carried by P Hallington *et al.*, most fistulas occurred after abdominal surgeries and a high proportion (52.7%) occurred in association with IBD, where 19.9% healed spontaneously and 82% after definitive surgery with an overall mortality rate of 10.8% [5]. In the UK, of 50 patients with ECF, 10 patients were internal referrals and 45 patients were from other institutions; with the overall mortality being 7% [6].

In Tanzania, with an M: F ratio of 1.4:1; it was the most common postoperative complication at a frequency of 91.3%; the complication rate of ECF was 34.8% and sepsis was the most common [7]. In Nigeria, a frequency of 5 admissions per year with 62% of cases coming as a referral from the periphery [8].

In Cameroon, a few studies concerning ECF were done. A review article by Weledji on the perspective of ECF revealed that, the management is heavily influenced by the underlying aetiology and anatomical classification of the fistula, which together determine the likelihood of resolution without surgical intervention [9]. Chichom *et al.*, in their article on 238 re-operations after abdominal surgery, 10.9% of re-operations were because of digestive fistulas [10]. In his article on complications of laparotomies, 0.3% were intestinal fistulas, mean age of 37.5 years and 56.2% female predominance [8]. In 2013, Ngowe *et al.* reported a case on the management of a biliary fistula showing that conservative management was effective with the closure of the fistula on day 42 of admission [11]. There is a paucity of Data on ECF in Cameroon especially on its prevalence, management, and outcomes.

## 2. Patients and Methods

It was a retrospective and descriptive study of hospitals registers and medical records of patients who had enterocutaneous fistula during their stay in the surgical unit of Buea regional hospital and Laquintinie hospital of Douala. From the 1<sup>st</sup> January 2017 to 31<sup>st</sup> December 2021.

The Buea Regional Hospital is a tertiary health care facility with about a 100-bed capacity. It has various facilities. The Laquintinie Hospital, Douala is a secondary referral health care facility, it covers over 10 hectares. It has a capacity of more than 200 beds.

We include all complete medical records of patients admitted at the surgical unit and had ECF at BRH and Laquintinie Hospital of Douala, Including those referred. This file included: Age, Sex, past history, indication of the surgery, treatment that the patient received, Length of stay in the hospital, the complications, outcome and the Para clinical investigations.

A designed data collection form was used in getting information from medical records of patient who had ECF in the surgical department.

The data collected for this study considered the following parameters of the patient:

- ❖ Demographic data (age, sex, occupation),
- ❖ Mode of admission (emergency, elective, referral),
- ❖ Past history (prior surgery, comorbidities, IBD, cancer, radiation therapy, obesity, HIV...),
- ❖ Post-operative indication,
- ❖ Time frame of the apparition of the fistula,
- ❖ Treatment modality and details of the treatment modality received (ATB, fluid, mode of nutrition, skin care...),
- ❖ Complications (sepsis, denutrition, excoriation, dehydration, electrolytes imbalance, anaemia),
- ❖ Length of hospitalisation,
- ❖ Length of healing,
- ❖ The outcome (spontaneous closure, persistence, death).

To maintain a high level of confidentiality, all data collection forms were coded and entered into Epi info version 7 on a computer which was coded, data were exported to Microsoft excel 2019 and analysed using Statistical Package for Social Science (SPSS) version 26. Continuous variables were expressed as means and standard deviation whereas categorical variables were expressed as proportions and percentages.

### 3. Results

During this study, one thousand three hundred and forty-three (1343) medical records were reviewed. 83 (6.2%) medical records were recruited and included in the study.

There was a female predominance of 59% with the percentage of male being 41%. The mean age of participants was 38.8 years, standard deviation 16.0. The greatest majority (51.8%) were between 31 - 60 years, 30.1% were between 16 - 30 years, 13.3% were more than 60 years and 4.8% were less than 15 years. The majority of participants were self-employed 16.9%, followed by students 15.7%, housewives 15.7%, taxi drivers 12.9%, applicants 8.4% and farmers.

Hypertension (HTN) was predominant with 8.7%, followed by obesity 7.2%, gastro-intestinal cancer 6% and HIV 4.8%, while 72.1% of patients had no comorbidities (See **Table 1**)

- **Mode of Admission (MOA):** Referred cases of ECF for better management were the most common 42.2, followed by ECF secondary to emergency surgeries 41%, and finally ECF secondary to elective surgeries 16.9%,
- **Fistula Output:** High output fistulas were the most common with 43.4%, followed by low output with 39.8% and the least was moderate output fistula with of 16.9%,
- **Time Frame for the Apparition of the Fistula:** the mean was 4.82 days, median 4 days, and standard deviation 1.7.

The clinical characteristics are represented in the table below (see **Table 2**).

Post-operative enterocutaneous fistulae was the most common with 96.4%,

**Table 1.** Comorbidities of patients with ECF.

Variable	Category	Frequency	Percentage (%)
Comorbidity	HTN	7	4.8
	Obesity	6	7.2
	GI cancer	5	6
	HIV	4	4.8
	Diabetes	4	4.8
	Missing	54	72.1
<b>Total</b>		<b>83</b>	<b>100</b>

**Table 2.** Clinical characteristics of ECF in the studied population.

Variable	Category	Frequency	Percentage (%)
M O A	Elective	14	16.8
	Emergency	34	41
	Referral	35	42.2
	<b>Total</b>	<b>83</b>	<b>100</b>
Fistula output	High output	36	43.4
	M. output	14	16.9
	Low output	33	39.8
	<b>Total</b>	<b>83</b>	<b>100</b>

followed by spontaneous enterocutaneous fistulas with 2.4% which occurred in patients with GI cancer, and then traumatic enterocutaneous fistulae with 1.2%.

Among the indications of surgical intervention that led to the enterocutaneous fistulae, appendectomy was the most common (**Figure 1**).

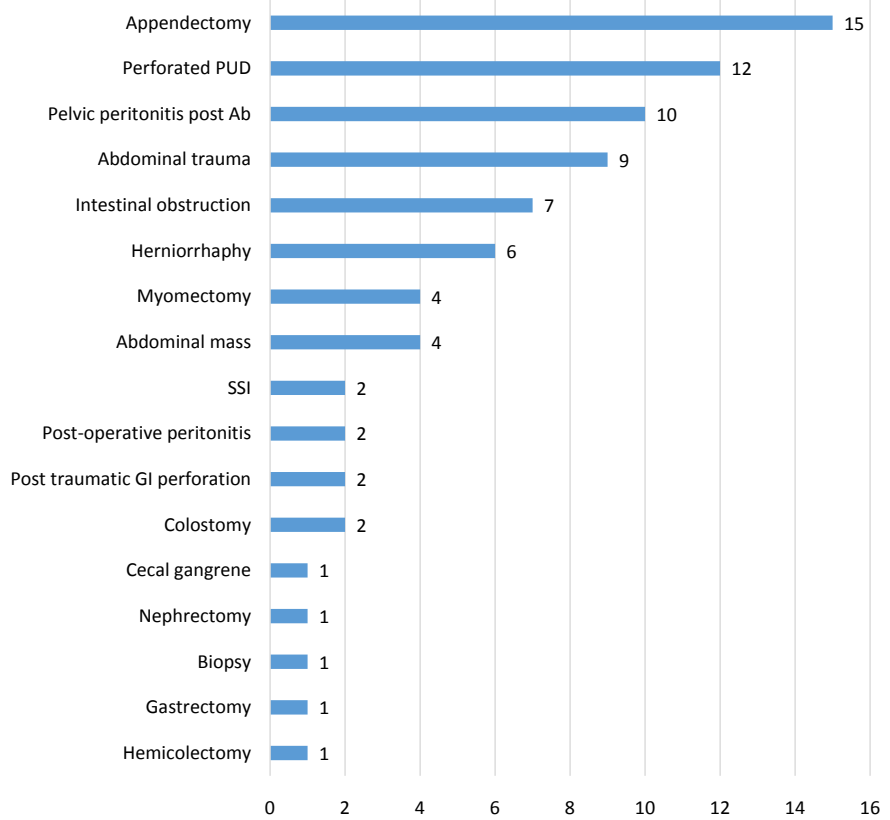
Total prevalence of ECF in Buea regional hospital and Laquintinie hospital of Douala.

Out of 1341 medical records in both hospitals, medical records of patients with enterocutaneous fistula that were selected and included in our study was 83, giving a prevalence total of 6.2%.

The mean time frame between the operation and the appearance of the fistula was 4.82 days, the median was 4 and the SD  $\pm$  1.761.

Out of 83 cases, 56.7% were managed conservatively, 6% were managed surgically and 37.3% received both treatment (**Table 3**).

In total 78 patients received conservative management. They all received an aggressive fluid therapy and 97.4% were placed on systematic antibiotics (ATB), Enteral Nutrition (EN) was the preferred route of feeding with 61.4%, and fistulae effluent was achieved with Proton Pump inhibitor in 90% of patients. A total of 56.4% received a blood transfusion, protein supplement was given to 38.5% of patients; potassium chloride was given to 41% of patients and 24.3% were placed on an anticoagulant.



**Figure 1.** Indications of surgical procedures that led to enterocutaneous fistulae.

**Table 3.** Modalities of treatment of enterocutaneous fistulas.

Variable	Category	Frequency	Percentage (%)
<b>Modality</b>	Medical	47	56.7
	Both	31	37.3
	Surgical	05	06
	<b>Total</b>	<b>83</b>	<b>100</b>

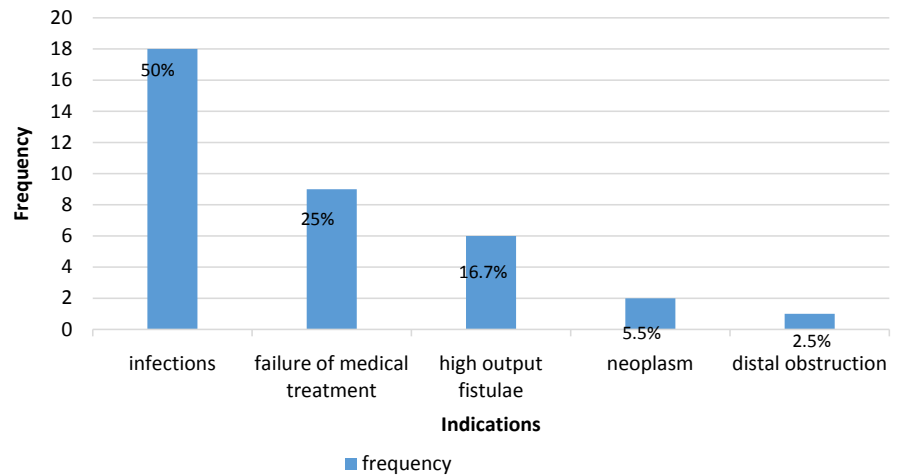
A total of 36 patients underwent surgery for the management of ECF. Infection was the commonest indication with 50%, followed by failure of medical treatment with 25%, high output fistulae at 16.7%, neoplasm at 5.5% and then distal obstruction at 2.5%. The indications are represented in **Figure 2**.

The mean time frame for re-intervention was 15.74, standard deviation +/- 9.9.

Ileostomy was done in 55.5% of patients, followed by Colostomy with 27.8% and then Jejunostomy with 16.7%. The damage control surgery is represented in **Table 4**.

In our study, Resection with end-to-end anastomosis was the preferred repaired work with 61%, followed by resection with end-to-side anastomoses 36% while 3% underwent a Hartmann’s intervention.

Following the management of ECF, the mortality rate was 38%, 29% healed



**Figure 2.** Indications of surgical treatment of enterocutaneous fistulas.

**Table 4.** Damage control surgery of enterocutaneous (dcs).

Variable	Category	Frequency	Percentage (%)
DCS	Ileostomy	20	55.5
	Colostomy	10	27.8
	Jejunostomy	6	16.7
	<b>Total</b>	<b>36</b>	<b>100</b>

spontaneously after conservative treatment, 22% healed after surgical treatment, 7% persisted after surgery and 4% persisted after conservative treatment. The outcomes are represented on **Figure 3**.

Following conservative treatment, a vast majority of cases healed between 4 weeks (26.1%) to 5 weeks (34.8%) while a vast majority of patients healed at 8 weeks (71.4%) after surgical treatment. The duration of healing is represented in **Table 5**.

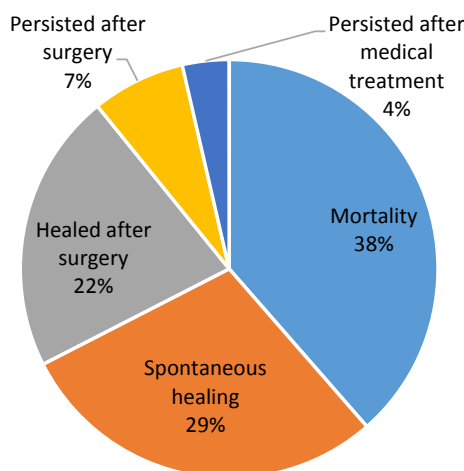
The mean duration hospitalization was 41 days, Standard deviation of  $\pm 1.4$ .

The commonest complication was anaemia (85.5%), followed by sepsis (43.3%), electrolytes imbalance (41%), malnutrition (32.5%), dehydration (31.4%), Skin excoriation (24%) and intestinal failure (10%).

#### 4. Discussion

The goal of our study was to determine the prevalence of enterocutaneous fistulas, analyse the management and describe the outcomes within the surgical department of Buea regional hospital and Laquintinie hospital of Douala over the five past years, to apply preventive strategies to reduce the prevalence of the disease and therefore associated morbidity.

The study constituted 1343 medical records within which there were 83 medical records of patients with ECF. There was a female predominance at 59%, mean age 38.8 years with the peak age between 31 to 60 years.



**Figure 3.** Outcomes of the management of enterocutaneous fistulas.

**Table 5.** Duration of healing of ECF according to the treatment modality.

Variable	Healing		Total
	healed after surgery	spontaneous healing	
3 weeks	0 (0.0%)	1 (4.3%)	1 (3.3%)
4 weeks	0 (0.0%)	6 (26.1%)	6 (20.0%)
5 weeks	1 (14.3%)	8 (34.8%)	9 (30.0%)
6 weeks	1 (14.3%)	5 (21.7%)	6 (20.0%)
7 weeks	0 (0.0%)	3 (13.0%)	3 (10.0%)
8 weeks	5 (71.4%)	0 (0.0%)	5 (16.7%)
<b>Total</b>	7 (100.0%)	23 (100.0%)	30 (100.0%)

The prevalence of ECF was 6.2%. This is relatively higher compared with a study done in 2020 in Morocco which was 0.9%, this could be explained by the fact that their sample size was smaller, the study was done in one hospital and over period of 4 years [12]. Notwithstanding, it was almost the same as study done in Brazil (5.5%) [7]. The high prevalence of ECF can explained buy the burden of peripheral hospitals which most at times lack qualified personnel for the early diagnosis and treatment of some conditions that lead to ECF.

We had 42.2% of referred cases from peripheral hospitals for better management; this is lower than other studies where the percentages were 76% and 62.8% [4] [13] but higher than the study done by Quinn M in the UK where she had 30.7% of cases who were referred [4]; these findings could be explained on the one hand by the difficulty of taking charge of fistulas by peripheral structures in our country and on the other hand by the delay put for the treatment of the initial pathology, but the differences in percentages can be explained by the different sample sizes. 96.4% occurred as post-operative complications following laparotomies, 2.4% occurred spontaneously in patients who had GI cancer and 1.2% were secondary to trauma; this follows the results of D. Bawa who had



96.5% of ECF as a postoperative complication [14] but slightly higher than other studies [4]; so our result is in line with what is writing in literature, which staple that the most common cause of ECF is iatrogenic and occurs in the postoperative period. As postoperative complication, 41% occurred secondary to emergency surgeries while 16.8% were secondary to elective surgeries. Surgery for the appendectomy was predominant and accounted for 18.8%, followed by surgeries for perforated PUD at 15%; Igwe Po *et al.*, in Nigeria, had a higher percentage of 36.4% as ECF due to appendectomies but their result is higher due to the difference in sample size [15]; this is because appendectomy is the commonest procedure in the surgical practice. The mean time frame for the apparition of the fistula was 4.82 days. Most fistulas were high output (43.4%) and hypertension was the commonest comorbidity, followed by obesity and cancer of the GI tract.

Conservative treatment was the commonest modality with a frequency of 56.6%, followed by conservative management with surgical management at 37.3%, and surgical management was the last with 5.6%. Other authors like Amine had a frequency of 70% of patients who received both modalities while 30% received only conservative treatment [16]. Hollington had a frequency of 67% of patients receiving both modalities while 33% received only conservative treatment [5]. Conservative management was preferred in our setting because, in the literature, conservative management is the most adopted, with it there's less risk of re-fistulisation, more chance for healing, and for a patient to go to the theatre there should be an indication.

Our study revealed that, patients who received conservative management were all placed in systematic antibiotics therapy. Other authors reported the same result [16]. This is because Control of infection is important for stabilizing patients with ECF, broad-spectrum antibiotics have been reported to reduce mortality by up to 30% in some cases and should be given without delay [5] [17]. Meanwhile, other authors like Alegbeleye B and Dumas RP suggest that routine use of broad-spectrum, empirical intravenous antibiotics should be avoided for treating ECF unless there's evidence of intra-abdominal collections or wound infections with associated cellulitis [18] [19]. But we are in a developing country, a setting where the technical board is unreliable so there's always a risk of infection hence it should be prevented. The commonest route of nutrition was enteral nutrition with 57.8%, Amine in his study also had a predominance of EN at a higher percentage of 75% [16], and the result is relatively low in our study because we have a higher sample size. Enteral feeding is the preferred route, it is known to preserve gut mucosa, immunological and hormonal function of the GI tract [20] and promote anastomotic healing [21]. Also, it is mostly used due to its relatively low cost, greater availability, and fewer complications.

Effective control of fistula effluent was achieved with protein pump inhibitors in 90% of patients; as it serves for both acid neutralization and volume reduction helping in preventing gastritis and stress ulcers whereas decreasing fistula output allows easier control of electrolytes and acid-base imbalance. 53% of patients had a blood transfusion and this is because anaemia was the commonest complica-

tion. Anticoagulant was given to 24% of patients, even though it has not been reported in other studies, this might be due to the fact that, these patients are at risk to embolic events because of their low mobility. Electrolytes that usually require significant supplementation are sodium, potassium, and magnesium [22], but in our study only 18.1% received sodium and 41% received potassium. Nearly all fistulas have an output that is rich in potassium, making hypokalaemia the most common electrolyte disturbance which should be aggressively treated and corrected to avoid arrhythmia and organ damage.

The commonest indication of surgical treatment was infection (50%), followed by failure of medical treatment (25%), high output fistulae (22.2%), neoplasm (5.5%) and distal obstruction (2.8%); same as the results of another study [16] in one hand but different but from the results of studies in the other hand where high output fistula was the first indication of followed by infections [16] [23] [24] the discrepancy can be explained by the different settings and studied population; but we can conclude that peritonitis, high output fistulas and failure of medical treatment are among the commonest indications of surgical treatment of ECF. Ileostomy and resection with end-to-end anastomosis were done in most patients, this joins the results of several authors [16] [25], and what is said in literature, the preferred surgical procedure is complete resection of the bowel segment containing the fistula and end-to-end anastomosis [18] [26] [27] as it provides optimal chances for permanent resolution of the fistulae tract. The mean time for surgical treatment was 15.74 days; SD +/- 9.945, but Lynch AD in his study pointed out the fact that patients operated on less than 12 weeks after the apparition of the fistula had a recurrence rate of 28% while those operated 12weeks after decreased the risk by 15% [28], but in our case, the early operation was because of the early apparition of complication and inability to control the fistula output.

The mortality rate was 38.6%; these results fit in with the ones of Muhindo in Congo and Pl Chalya in Tanzania who both had a mortality rate of more than 30% [7] [22] but higher than the results obtained by Visschers in Switzerland, Hollington in Spain and Datta V in the UK [5] [6] [29] which were all less than 10%, this can be because all those studies were carried in areas with more means and better medical technology platform. But in a setting like ours, where patients a referred late, there are limited means of medical resuscitation due to the poverty we can expect such results. Nevertheless, 28.9% of fistulas healed spontaneously and 21.7% healed after surgery, while in Nigeria GE Njeze had 31.7% of spontaneous healing and 84% of healing after definitive surgery [30]; this rate explains good care with mastering conservative treatment despite certain material and financial limitations. Also, 7.2% of fistulas persisted after surgical treatment and 3.6% persisted after conservative treatment, this result just confirms that conservative management is preferred and has a better outcome and more chances of healing as said in the literature.

Anaemia was the commonest complication in our study at a frequency of 85.5%, followed by sepsis (43.4%), electrolyte imbalance (41%) and malnutrition (32.5%).

This was like studies carried out in Tanzania and Congo where sepsis, anaemia and electrolyte imbalances were among the top five complications of ECF [7] [16]. Muhindo in Congo, in 2020 also did this observation with 7.7% of cases of malnutrition.

The mean duration of hospitalisation was 41 days in our study, which is higher than the result of Amine who had 12 days [16] but in the same line as the result of Janana W who had 25.6 days [31] and Visschers who had 59 days [29]. This variability can be explained by the setting, different management modalities and means of treatment used by each hospital.

## 5. Conclusion

The prevalence of enterocutaneous fistulas was 6.2%, with a female predominance and a mean age of 38 years. A vast majority of cases seen came as a referral from peripheries for better management. Most fistulas occurred secondary to operation, with appendectomy being the commonest indication. High output fistulae were predominant. Conservative management with enteral feedings was preferred, they had better outcomes and gave more chances of healing. Patients were sent to the theatre for surgical management only if there was an indication with infection being the most common indication in our study. Ileostomy was the most common control damage surgery, and resection with end-to-end anastomosis was the preferred repaired work. The mortality rate was high (41%). Anaemia, sepsis, and electrolyte imbalances were the commonest complications.

## Limitations

- This was a hospital-based study done in only two hospitals, it is not completely representative of the total population with enterocutaneous fistulae, as not all of them are found in hospitals or referred to those hospitals,
- As in most retrospective study, there were a lot of missing data. Conclusions are therefore biased and underestimated since they are made based on available data.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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