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HIV seroprevalence, clinical profile and surgical outcomes among patients with acquired anorectal conditions in two referral hospitals in Mwanza, Tanzania

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Abstract

Background: HIV infection, a major health problem worldwide, is prevalent in patients with acquired anorectal conditions. There is a paucity of prospective studies regarding acquired anorectal conditions in Tanzania. This study describes the HIV seroprevalence, clinical profile and surgical outcomes among patients with acquired anorectal conditions at Bugando Medical Centre (BMC) and Sekou-Toure Referral Regional Hospital (SRRH).

Methods: This cross-sectional study was conducted among patients with acquired anorectal conditions as seen at BMC and SRRH from January 2019 to June 2019.

Results: A total of 389 patients (M: F ratio = 1.5:1) were studied. The median age at diagnosis was 42 years. Out of 389 patients, 101(26.0%) were HIV positive. Of these, 54(53.5%) were males and 47 (46.5%) were females. Haemorrhoids were the most common acquired anorectal disease accounting for 50.9% of cases. The rate of HIV infection in this study was significantly high in patients with hemorrhoids ($p< 0.001$), perianal ulcers ($p< 0.001$), anorectal abscess ($p = 0.009$), perianal warts ($p< 0.001$) and rectal prolapse ($p = 0.023$). A total of 173 (44.5%) patients underwent surgical treatment for acquired anorectal conditions. Hemorrhoidectomy was the most commonly performed surgical procedure in 95(54.9%) patients. Out of 171 patients who underwent surgical treatment and outcomes evaluated, 138 were treated successfully giving an overall success rate of 80.7%. The success rate was significantly influenced by HIV positivity ($p = 0.002$). Surgical site infection (SSI) was the most common postoperative complication accounting for 25.8% of cases. The rate of SSI was found to be significantly higher in HIV-positive patients than in HIV-negative patients (39.6% vs 18.5%; *p*-value = 0.001).

Conclusion: HIV infection is prevalent among patients with acquired anorectal conditions in our setting and influences surgical outcomes. We recommend that all patients with acquired anorectal conditions in this region should be screened for HIV infection.

Keywords: *Acquired anorectal conditions, HIV seroprevalence, clinical patterns, surgical outcomes, Tanzania*

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Introduction

Acquired anorectal conditions are among the most challenging surgical conditions managed by general and colorectal surgeons and contribute significantly to high morbidity and mortality worldwide(Janicke&Pundt., 1996; Igwe*et al*., 2014). These surgical conditions of the anorectumare the common reasons for clinic visits and indications for surgery and therefore comprise a significant

proportion of surgical workload in most centres (Igwe*et al*., 2014). Globally, acquired anorectal conditions have been reported to be more common in HIV-positive patients and 6%-34% of seropositive patients suffer from them (Kołodziejczak*et al*., 2014; Oh *et al*., 2014; Bakhiet*et al*., 2015). It is estimated that more than half of HIV-positive patients with acquired anorectal conditions will require surgery(Bakhiet*et al*., 2015).In Tanzania at large and Bugando Medical Centre in particular, unlike congenital anorectal conditions which are well studied in our centre (Mfinanga *et al*., 2018), the acquired anorectal conditions data are limited. However, it might be as big as other countries of the same characteristics in terms of geographical location, economic status and health profile.

The current prevalence of HIV infection in the general population in Tanzania mainland is 4.7% (Tan *et. al*. 2015; Johnston *et. al,* 2016; Tanzania HIV Impact Survey., 2017; Global AIDS monitoring 2017). Several studies in Tanzania have documented the prevalence of HIV infection in surgical patients (Mkony*et al*.,2003; Giit*et al*.,2010*;* Mayala*et al*., 2010; Sravanam*et al*., 2018). A study done by Mkony*et al* (2003) at Muhimbili National Hospital among newly hospitalized surgical patients found a prevalence of 10.5%. Locally at Bugando Medical Centre, a study done by Giit*et al*(2010) among patients with appendicitis found an HIV seroprevalence of 13.1% and another study done among trauma patients found a prevalence of 11.6% (Mayala*et al*., 2010). Recently, Sravanam*et al* (2018) at Bugando Medical Centre reported an HIV seroprevalence of14.2% in patients with surgical acute abdomen; but limited information is available in patients with acquired anorectal conditions about their HIV serostatus. Therefore, this research gap underscored the need to justify the execution of the current study.

The patterns of acquired anorectal conditions differ in the general population as compared to HIV infected population. Acquired anorectal problems seen in the general population include anal fissure, fistula in ano, external and internal haemorrhoids, perirectal abscess, nonspecific pruritus and perianal infection with *herpes simplex virus (HSV)* type 2 and rare tumours such as anal squamous cell cancer (Johanson *et al*., 1990; Nelson *et al*., 1995; Abramowitz *et al*., 2014; Igwe*et al.,* 2014; Kayamba *et al.,* 2018). On the other hand, in addition to the classic anorectal conditions such as haemorrhoids, fistulas, and fissures, HIV-positive patients also present with venereal diseases such as condylomas, gonorrhoea, syphilis, and chlamydia (Wexner*et al*., 1986; Hyder& MacKeigan., 1988; Safavi*et al*., 1991) as well as other typical HIV-positive diagnoses (*Cytomegalovirus*(CMV), *herpes simplex*, candida, and idiopathic ulcers) (Hyder& MacKeigan., 1988; Miles *al*., 1991Safavi*et al*., 1991; Nadal *et al.,* 1999). Neoplasms are also referred to as being more prevalent than in the HIV-negative population, mainly Kaposi's sarcoma, non-Hodgkin's lymphomas and epidermoid anal cancer, which is associated with human papillomavirus(HPV) infection (Miles *et al*., 1991 Safavi*et al*., 1991; Melbye&Sprogel., 1991; Chadha*et al*., 1994).

Anorectal symptoms are common in the general population and even more so in individuals with human immunodeficiency virus (HIV) infection. Symptoms can be acute and short-lived, such as the pain with a thrombosed external haemorrhoid or acute anal fissure or they can be chronic such as that with a chronic anal fissure (Abramowitz*et al*., 2014).

The management and surgical outcomes of acquired anorectal conditions are challenging and depend on early, correct diagnosis and comprehensive management. Generally, the surgical outcomes are good with exception of anorectal malignancies (Chadha*et al.,* 1994), mainly due to the nature of the disease and late presentation to health facilities. The documented outcomes among benign anorectal conditions are excellent (Nelson *et al*., 1995; Oh *et al*., 2014).HIV infection has been reported to influence the surgical outcomes of acquired anorectal conditions (Nadal *et al.,* 1999; Bakhiet*et al*., 2015). However, the current seroprevalence of HIV infection and its effect on surgical outcomes among patients with acquired anorectal conditions in our local setting is unknown. Knowing the burden of anorectal conditions and subsequently, instituting routine screening of HIV infection among patients with these conditions is pivotal for expedited management and favourable patient outcomes. This study aimed to determine the HIV seroprevalence, clinical patterns and surgical outcomes among

patients with acquired anorectal conditions as seen at Bugando Medical Centre and Sekou-Toure Referral Regional Hospital in Mwanza region.

Patients and Methods

Study design and setting

This was a cross-sectional study which was conducted at the emergency department and in the surgical outpatient clinics and wards of Bugando Medical Centre (BMC) and Sekou-Toure Region and Referral hospital (SRRH) from January 2019 to June 2019. These two hospitals were conveniently selected because of their proximity in northwestern Tanzania is a consultant, tertiary care and teaching hospital for the Catholic University of Health and Allied Sciences-Bugando (CUHAS-Bugando) and other paramedics and it is located in Mwanza City in the north-western part of the United Republic of Tanzania. It is situated along the shore of Lake Victoria and has an 890-bed capacity. BMC is one of the four largest referral hospitals in the country and serves as a referral center for tertiary specialist care for a catchment population of approximately 17 million people from neighboring regions. SRRH is a public regional facility serving the population of the Mwanza Region on the shore of Lake Victoria in northwestern Tanzania. It is located in Nyamagana municipality and has 450beds. The hospital serves a catchment area with a population of 1.3 million people from seven districts of the Mwanza region (i.e. Kwimba, Magu, Sengerema, Misungwi, Ukerewe, Nyamagana and Ilemela). SRRH is also a teaching hospital for the CUHAS-Bugando.

Study population

The study included all patients with acquired anorectal conditions attending the emergency department, surgical outpatient clinics (SOPD) and wards of BMC and SRRH and who consented to the study and HIV testing. Patients who did not turn up for follow-up one month after surgery were excluded from the study. The sample size (n) for all patients enrolled in the study was calculated using the formula by Cochran (1977). Convenience sampling for patients who met the inclusion criteria was enrolled until the sample size is reached.

Recruitment of patients

Recruitment of patients was done at the emergency department, SOPD and in the surgical wards BMC and SRRH. After informed consent to participate in the study and to be tested for HIV, all patients who met the inclusion criteria were consecutively enrolled on the study. All patients were pre-counselled by a professional HIV counsellor according to current guidelines in the hospital. HIV serology test was performed using the Tanzania HIV Rapid Test Algorithm (Lyamuya *et al*, 2009). All recruited patients were managed according to the current protocol in their respective hospitals. The authors ensured that the study patients were receiving the appropriate treatment as prescribed by the surgeon. The patient was declared cured if the symptoms and signs presented are no more. Patients were followed up until discharge or death. Post-discharge follow-up was limited to patients with mobile phones and those who attended SOPD one month after surgery. Patients who were found to be HIV positive were referred to the Care and Treatment Clinic (CTC) after post counselling.

Data collection

Data on each patient was collected and entered into a pretested coded questionnaire prepared for the study. Data entered in the questionnaire included; demographic profile (age, sex, area of residence), clinical presentation, diagnosis, HIV infection status, the treatment offered (surgery), the timing of the operation, rank of the surgeon, type of surgical procedure, and treatment outcome (cure, postoperative complications and mortality).

Statistical data analysis

The statistical data analysis was performed using STATA version 13. The median + Interquartile Range (IQR) and ranges were calculated for continuous variables whereas proportions and frequency tables were used to summarize categorical variables. Chi-square ($\chi 2$) and Fisher's exact tests(depending on

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the size of the data set) were used to test for the significance of association between the independent (predictor) and dependent (outcome) variables in the categorical variables. A *p*-value of < 0.05 was considered to constitute a statistically significant difference.

Results

Socio-demographic characteristics

Between January 2019 and June 2019, a total of 393 patients with acquired anorectal conditions were managed at BMC and SRRH. Of these, 389 patients, representing 98.9% of cases were enrolled in the study and the remaining 4 patients were excluded from the study due to failure to meet the inclusion criteria. Generally, 232 (59.6%) were males and 157(40.4%) were females with a male to female ratio of 1.5: 1. Their ages at diagnosis ranged from 1 year to 98 years with a median age of 42 years [interquartile range, 30-54 years]. The modal age group was 41-50 years accounting for 22.1% of cases (Figure 1).
Of the 389 patients included in the study, 101(26.0%) tested positive for HIV. Of these, 54(53.5%) were males and 47 (46.5%) were females giving a male to female ratio of 1.1: 1. The age at presentation for HIV-infected patients ranged from 20 to 90 years with a median age of 43 [IQR, 35 – 51] years.

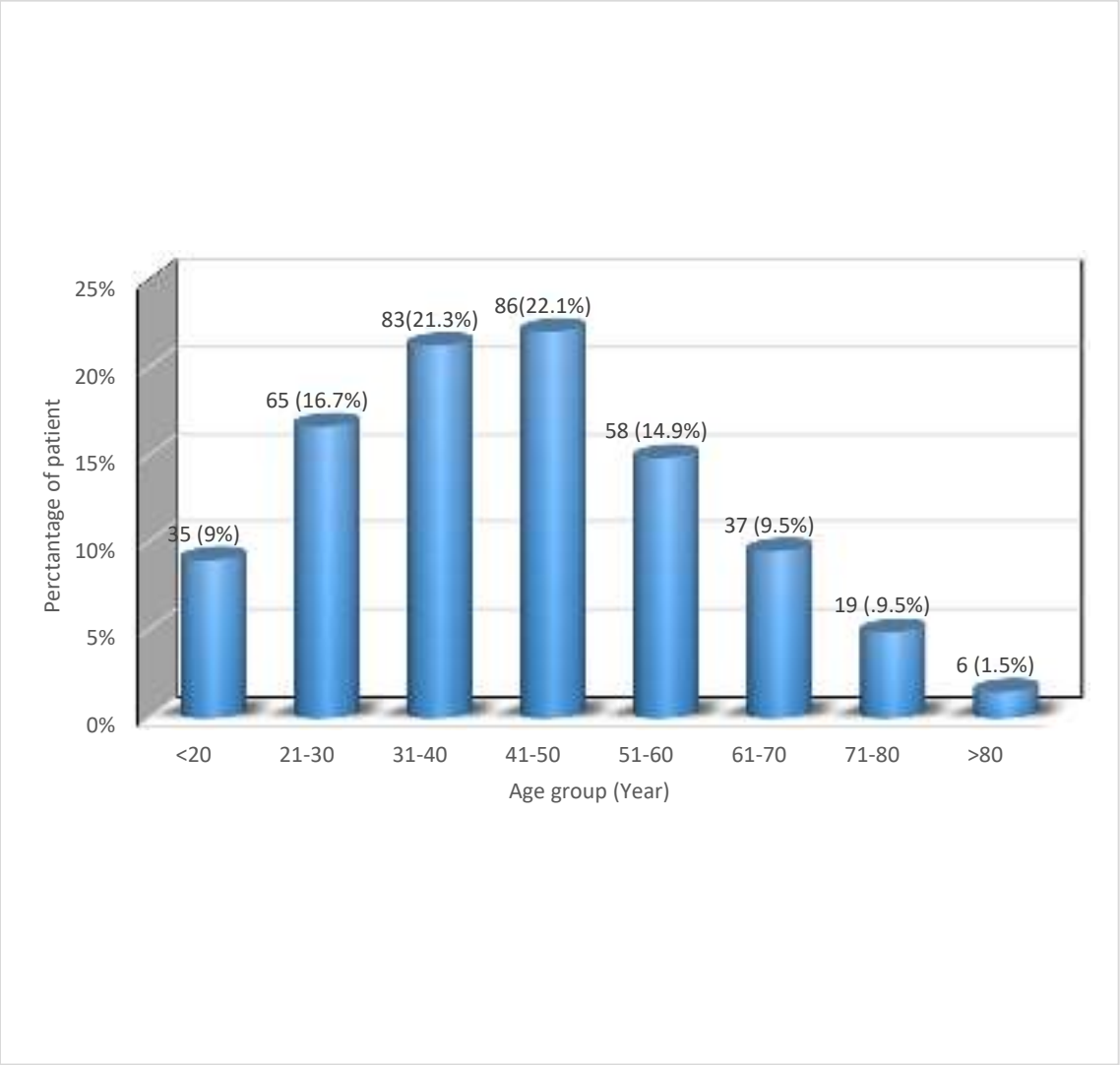

Figure 1: Age group distribution of patients with acquired anorectal conditions

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Patterns of acquired anorectal conditions

Hemorrhoids were the most common acquired anorectal conditions accounting for 50.9% of cases (Figure 2). Out of 24 patients with anorectal malignancies 19 had adenocarcinoma, 4 and 1 had squamous cell carcinoma and lymphoma, respectively. The pattern of acquired anorectal conditions showed male predominance as shown in Table 2 below. The rates of HIV infection were significantly high in patients with hemorrhoids, perianal ulcers, anorectal abscess, perianal warts and rectal prolapse as shown in Table 3.

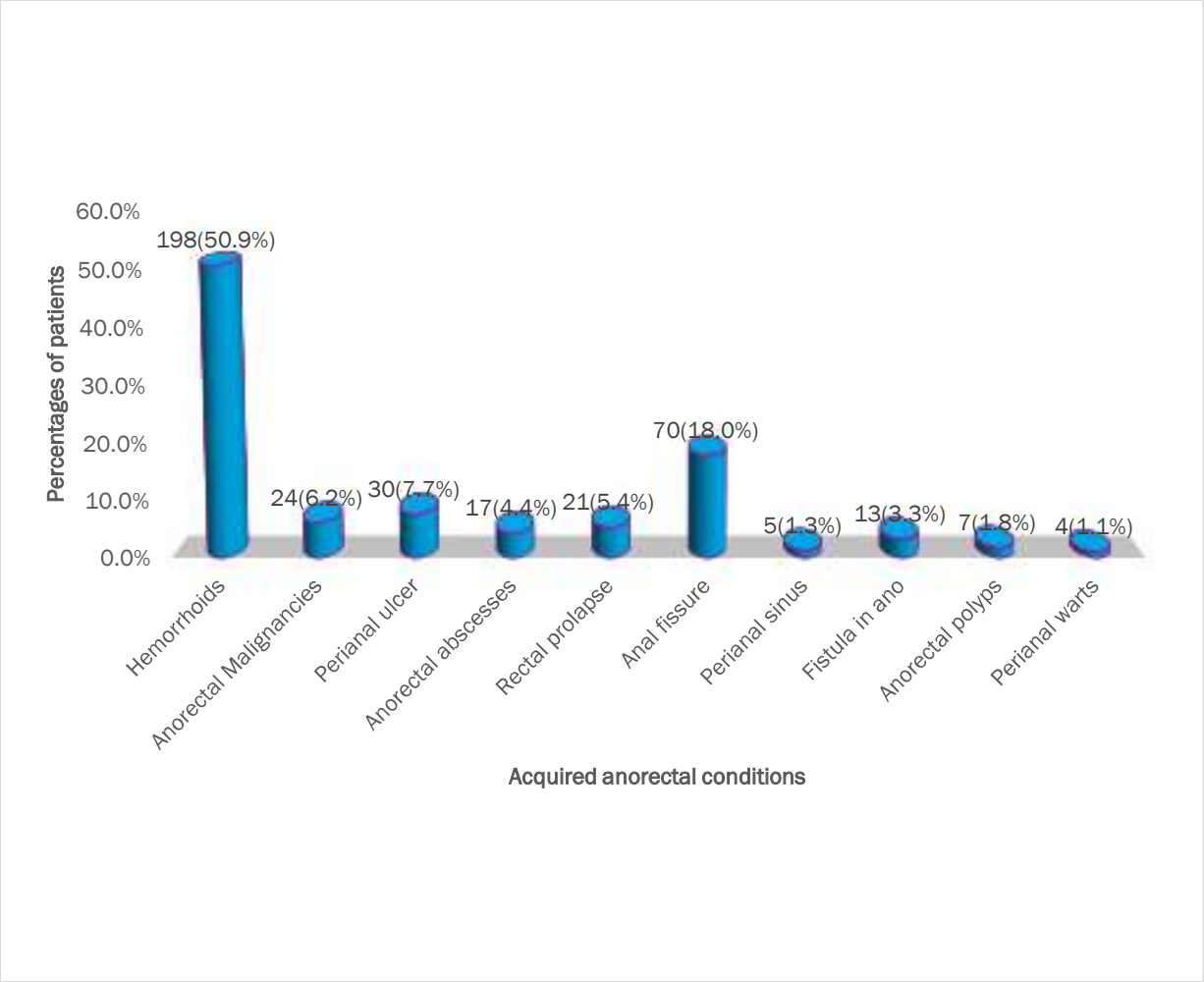

Figure 2: Distribution of patients according to acquired anorectal conditions

Table 1: Gender distribution of patients with acquired anorectal conditions

Anorectal conditions	Sex		Total (N/%)
	Male (N/%)	Female (N/%)	
Hemorrhoids	120(30.8)	78(20.1)	198 (50.9)
Anal fissures	39(10.0)	31(8.0)	70(18.0)
Perianal ulcers	13(3.3)	17(4.4)	30(7.7)
Anorectal malignancies	12(3.1)	12(3.1)	24(6.2)
Rectal prolapse	14(3.6)	7(1.8)	21(5.4)
Anorectal abscess	13(3.3)	4(1.1)	17(4.4)

Fistula in ano	13(3.3)	0(0.0)	13(3.3)
Anorectal polyps	3(0.7)	4(1.1)	7(1.8)
Perianal sinus	2(0.6)	3(0.7)	5(1.3)
Perianal warts	3(0.7)	1(0.4)	4(1.1)
Total	**232 (59.6)**	**157(40.4)**	**389(100.0)**

Table 2. Disease pattern distribution according to HIV status

Anorectal conditions	**HIV status**		***p*-value**
	Positive (N/%)	Negative (N/%)	
Hemorrhoids	33(16.7)	165(83.3)	<**0.001**
Anal fissures	18(25.7)	52(74.3)	0.958
Perianal ulcers	22(73.3)	8(26.7)	<**0.001**
Anorectal malignancies	9(37.5)	15(62.5)	0.183
Rectal prolapse	1(4.8)	20(95.2)	**0.013**
Anorectal abscess	9(52.9)	8(47.1)	**0.009**
Fistula in ano	5(38.5)	8(61.5)	0.267
Anorectal polyps	0(0.0)	7(100.0)	0.120*
Perianal sinus	0(0.0)	5(100.0)	0.220*
Perianal warts	4(100.0)	0(0.0)	**0.004***

**p*-value obtained by 1-sided Fischer's exact test

The rate of HIV infection in this study was significantly higher in patients with perianal ulcers (p-value <0.001), warts (p-value = 0.004), anorectal abscess (p-value = 0.009) and rectal prolapse (p-value < 0.013).

Clinical characteristics of acquired anorectal conditions

The duration of illness ranged from 1 week to 260 months with a median duration of 13 months [IQR, 2 - 26 months]. The majority of patients, 161 (41.4%) had symptoms of more than 1-month duration at the time of presentation. The median time interval between onset of symptoms and presentation at our center was significantly short in patients who presented with anorectal disease associated with pain, compared with those who presented with painless anorectal disease (*p*-value = 0.012). The commonest presenting symptom was perianal swelling in 160 (41.1%) patients as shown in Table 1.

Table 3: Distribution of patients according to anorectal symptoms

Anorectal symptoms	**Number of patients**	**Percentage**
Perianal swelling	160	41.1
Anal bleeding	112	28.8
Pain	102	26.2
Discharge	56	14.4
Pruritus	42	10.8
Ulceration	30	7.7
Change in bowel habits	28	7.2
Prolapse	21	5.4
Incontinence	16	4.1

Treatment modalities

A total of 173 (44.5%) patients underwent surgical treatment for acquired anorectal conditions and the remaining 216 (55.5%) patients were treated conservatively with sitz bath, high fiber diet, stool softeners, stool bulking agents, topical nitroglycerin ointment etc. Of those who underwent surgery,

161 (93.1%) were operated on an elective basis, while 12 (6.9%) patients had emergency surgery. Table 4 shows surgical procedures done in patients with acquired anorectal conditions

Table 4: Surgical procedures done in patients with acquired anorectal conditions

Surgical procedure	Number of patients	Percentage
Hemorrhoidectomy	95	54.9
Fissurectomy	18	10.4
Surgical debridement	12	6.9
Incision & drainage of abscess	11	6.4
Delorme/Thiersch-suture/rectopexy	10	5.8
Fistulectomy /stone	9	5.2
Diverting colostomy	8	4.6
Anal polypectomy	7	4.0
Perianal sinus exploration/excision	5	2.9
Cauterization	4	2.3

The outcome of surgical treatment

Out of 173 patients who underwent surgical treatment, two patients did not turn up for assessment of either cure or not. Therefore, out of 171 patients who were evaluated on outcomes, 138 were treated successfully giving an overall success rate of 80.7%. The success rate was significantly influenced by HIV positivity (*p*-value = 0.002) as shown in Table 5 below. In this study, a total of 62 (35.8%; 62/171) postoperative complications were recorded in 54 patients. Of these, surgical site infection was the most common postoperative complications accounting for 25.8% of cases (Figure 3). In the present study, the rate of surgical site infections was found to be significantly higher in HIV-positive patients than in HIV-negative patients (39.6% vs 18.5%; *p*-value = 0.001).

Table 5. Analysis of factors influencing treatment outcome among patients undergoing surgical treatment for acquired anorectal conditions at BMC and SRRH (N= 173)

Independent (predictor) variable	Treatment outcome		X^2	*p*-value
	Cured (N/%)	Not cured (N/%)		
Age (years)				
○ <18	14(73.7)	5(26.3)		
○ 18-60	105(82.7)	22(17.3)		
○ >60	19 (76.0)	5(24.0)	0.994	0.529
Sex				
○ Male	100(84.0)	19(16.0)		
○ Female	38(73.1)	14(26.9)	2.891	0.095
HIV status				
○ Positive	16(59.3)	11(40.7)		
○ Negative	122(84.7)	22(15.3)	54.376	**0.002**
Disease duration				
○ < 1 month	10(90.0)	1(10.0)		
○ >1 months	128(79.4)	33(20.6)	1.643	0.094
Timing of surgery				
○ Emergency	9(75.0)	3(25.0)		
○ Elective	129(80.1)	32(19.9)	1.098	0.129
Rank of surgeon				
○ Junior	49(79.0)	13(21.0)		
○ Senior	89(81.7)	20(18.3)	0.911	0.677

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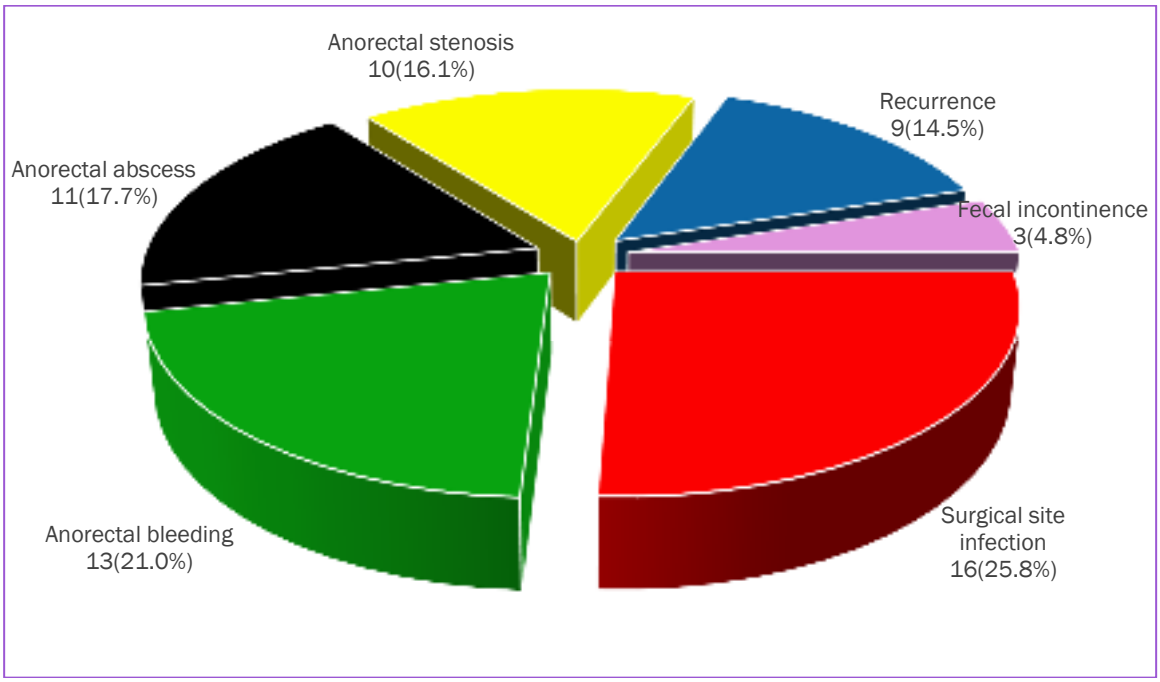

Figure 3. Distribution of patients according to postoperative complications (*Note: Some patients had multiple complications*)

Discussion

The prevalence of HIV infection has been reported to be higher in patients with acquired anorectal conditions than in the general population, thus constituting significantly high morbidity and mortality both in developing and developed countries (Haac*et al*., 2013; Bakhie*et al*., 2015). In this study, the overall HIV seroprevalence among patients with acquired anorectal conditions was 26% which is higher than that in the general population in Tanzania (4.7%) (Tan *et. al*. 2015; Johnston *et. al,* 2016; Global AIDS monitoring 2017; Tanzania HIV Impact Survey., 2017). However, the failure to detect HIV infection during the window period and the exclusion of some patients from the study may have underestimated the prevalence of HIV infection among these patients. A low prevalence of HIV infection among patients with acquired anorectal conditions has been reported in Sudan (Bakhie*et al*., 2015). This difference in HIV seroprevalence in these studies reflects differences in the overall prevalence of risk factors for HIV infection in the general population from one country to another. The author could not establish the reasons for high HIV seroprevalence in this study.

In the current study, the majority of patients were in the fourth decade of life and tended to affect more males than females. Similar age distribution and gender have been reported in other studies (Haac*et al*., 2013; Abramowitz *et al*., 2014; Bakhie*et al*., 2015). There was no obvious explanation for the high incidence of acquired anorectal conditions in this gender and age group; however, this can be explained by the fact that this is an active age group engaging in strenuous and high-risk activities which predispose them to anorectal conditions and HIV infections. This age distribution and male preponderance were also observed among HIV-positive patients. The reason for this observation is probably that males in this age group are more mobile with active participation in high risk-taking activities.

In our study, haemorrhoids were the most common acquired anorectal condition accounting for more than half of the cases. This observation is similar to the findings of other workers (Johanson*et al*., 1990; Nelson *et al*., 1995; Abramowitz*et al*., 2014; Igwe*et al.,* 2014; Kayamba*et al.,* 2018). In

agreement with other studies (Haac*et al*., 2013; Bakhiet*et al*., 2015), the rate of HIV infection in this study was significantly high in patients with hemorrhoids, perianal ulcers, anorectal abscess and rectal prolapse. We could not establish the reasons for the high HIV seroprevalence among these patients. However, having these anorectal conditions means loss of skin which is a well-known protective organ against infections like HIV and therefore one becomes vulnerable and especially more among homosexuality and unprotected sexual intercourse. On the other hand, having HIV infections leads to a lowering of body defence against infections and diseases in which the anorectal region is not spared (Bakhiet*et al*., 2015).

The clinical presentation of patients with acquired anorectal conditions in our patients is not different from those in other studies(Mansours-Khan., 2015; Kayamba*et al.,*2018), with bleeding, pain, discharge, perianal swelling, changes in bowel habits, pruritus, prolapse, incontinence being common to all the patients. As reported by many authors in developing countries (Mansours-Khan., 2015; Kayamba*et al.,*2018), the majority of patients in the present study presented late in advanced disease. We could not establish the reasons for the late presentation in this study. However, the majority of our patients had benign acquired anorectal conditions which are usually less symptomatic and affect little on daily activities which makes one less aggressive to seek medical attention until one is in an advanced stage. On the other hand, the patient's health-seeking behaviours, an embarrassment of presenting with the anorectal condition, attempting other treatment options and limited accessibility to competent health facilities could explain the probable cause of delay. This study was done in referral hospitals probably there were delays in the referral system and protocols leading to a late presentation at this level.

The majority of patients in this study were treated non-operatively and only 44.5% of patients had a surgical treatment done. The author could not establish the reasons for the low incidence of surgical procedures in this study but it could be because the majority of patients had benign anorectal conditions which usually respond well to non-operative management until when it fails then surgery becomes the last option. In the current study, hemorrhoidectomy was the most commonly performed surgical procedure in our setting. A similar treatment pattern has been reported in other studies (Milligan et *al*., 1937; Acheson&Scholefield., 2008). The evidence from a recent meta-analysis suggests that the stapled hemorrhoidopexy procedure is a more recent procedure which is less painful and safe, and that hospital stay is shorter, with a more rapid return to normal activities than conventional excision hemorrhoidectomy but has a high rate of recurrence on long term follow up studies Giordano et al., 2009). As with any technique the stapled hemorrhoidopexy has complications like bleeding, pain, urinary retention and sepsis (Oughriss*etal*., 2005). Therefore conventional hemorrhoidectomy remains a gold standard of treatment for hemorrhoids (Giordano *et al*., 2009). In our study, none of our patients had stapled hemorrhoidopexy done due to the lack of facilities for this procedure in our setting. Non-operative procedures like rubber band ligation, sclerotherapy, infrared photocoagulation, cryotherapy, etc. have been described and are reserved for 1- and 2-degree hemorrhoids but are currently not available in our setting.

The overall good treatment success of 80.7% demonstrated in this study is comparable to the figures from several previous studies (Barrett *et al*., 1998; Bakhiet*et al*., 2015). This might be attributed to the experience of the surgeons in our setting as the majority of surgical procedures were performed by senior doctors. In agreement with other studies (Barrett*et al*., 1998; Bakhiet *et al*., 2015), surgical site infection was the commonest postoperative complication in the present study attributing this to HIV seropositivity. In our study, the rate of surgical site infections was found to be significantly higher in HIV-positive patients than in non-HIV patients. The reason for this observation is that HIV infection causes impaired immunity predisposing them to surgical wound complications such as surgical site infections.

Limited follow-up time, difficulty to diagnose HIV infection in its early stage (window period) and failure to determine CD 4+ count in HIV-positive patients were the major limitations of this study. Also, the management of our patients from two different levels of hospitals (tertiary and regional) may have affected the clinical outcomes taking into consideration the difference in facilities present at these levels such as diagnostics, specialists and nurses. However, despite these limitations, the study has provided local data that can guide health care providers in the management of these patients.

In conclusion, this study has demonstrated that HIV seroprevalence is significantly high (26%) among patients with acquired anorectal conditions at BMC and SRRH; thus, a substantial risk of exposure to HIV exists in health care workers who care for these patients. Hemorrhoids remain the commonest acquired anorectal condition in our setting. The rate of HIV infection was significantly high in patients with hemorrhoids, perianal ulcers, anorectal abscess, perianal warts and rectal prolapse. More than eighty per cent of patients who underwent surgical treatment were successfully treated. The success rate was significantly influenced by HIV positivity. Surgical site infection was the commonest postoperative complication and it was found to be significantly higher in HIV-positive patients than in non-HIV patients. It is therefore recommended that:-

- All patients with acquired anorectal conditions attending health facilities in this region should be screened for HIV infection
- All health care workers caring for these patients in this region need to practice universal barrier precautions to reduce the risk of exposure to HIV infection.
- Similar study should be conducted in different settings, for a longer duration of time and to include CD4+ count for all patients.

Ethical consideration

After initial review by the department of surgery of CUHA/BMC, ethical approval to conduct the study was sought from the Joint CUHAS/BMC Research, Ethics and Review Committee (CREC/328/2019) before the commencement of the study. Permission to carry out the study was obtained from the hospital authority of BMC and SRRH respectively. Enrolled patients were required to sign a written informed consent for the study. In addition, assent was obtained from children aged 5-17 years. Patients were assured that the information collected was maintained under strict confidentiality as only initials instead of names were used for identity. The study did not interfere with the decision of the attending doctor and patients. Consent or withdrawal from the study did not alter or jeopardize their access to medical care.

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References

Abramowitz, L., Benabderrahmane, M., Pospait, D., Philip, J., Laouénan, C. (2014)The prevalence of proctological symptoms amongst patients who see general practitioners in France. *European Journal of General Practitioners* 20, 301–6.

Acheson, A.G., Scholefield, J.H. (2008)Management of haemorrhoids*. British Medical Journal* 336, 380.

Bakhiet, M.A.O., Salah, S.E., Hamza, A.A. (2015) Anorectal Diseases in HIV Positive Patients: Experience with 112 Patients. *Scholars Journal of Applied MedicalSciences*. 3, 411-416

Barrett, W.L., Callahan, T.D., Orkin, B.A. (1998) Perianal manifestations of human immunodeficiency virus infection. *Diseases of the colon and rectum* 41, 606–11.

Chadha, M., Rosenblatt, E.A., Malamud, S., Pisch, J., Berson, A. (1994) Squamous-cell carcinoma of the anus in HIV-positive patients. *Diseases of the Colon and Rectum* 37, 861-5.

Cochran, W. G. (1977) *Sampling techniques (3rd ed.)*. New York: John Wiley & Sons.

Giordano, P., Gravante, G., Sorge, R., Ovens, L., Nastro, P. (2009) Long-term outcomes of stapled hemorrhoidopexy vs conventional hemorrhoidectomy: a meta-analysis of randomized controlled trials. *Archives of Surgery* 144, 266–72

Gili, G.C., Mazigo, H.D., Heukelbach, J. &Mahalu, W. (2010) HIV, appendectomy and postoperative complications at a reference hospital in Northwest Tanzania: a cross-sectional study. *AIDS Research and Therapy* 7: 47.

Global AIDS monitoring (2017): indicators for monitoring the 2016 United Nations Political Declaration on HIV and AIDS. Geneva: UNAIDS; 2017 (http://www.unaids.org/sites/default/files/media_asset/2017-Global-AIDS-Monitoring_en.pdf)

Haac, B.E., Charles, A.G., Matoga, M., LaCourse, S.M., Nonsa, D., Hosseinipour, M. (2013) HIV testing and epidemiology in a hospital-based surgical cohort in Malawi. *World Journal of Surgery* 37, 2122–8

Hyder, J.W., MacKeigan, J.M. (1988) Anorectal and colonic disease and the immunocompromised host. *Diseases of the Colon and rectum* 31, 971-6.

Igwe, P.O., Dodiyi-Manuel, A., Oparaku, K.C. (2014) The pattern of surgically treatable anorectal diseases in the university of Port Harcourt teaching hospital, Rivers State, Nigeria.*Nigerian Journal of Medicine* 23, 57-60

Janicke, D.D., Pundt, M.R. (1996) Anorectal disorders.*EmergencyMedicineClinics of North America*14, 757-788.

Jayaraman, S., Colquhoun, P.H.D., Malthaner, R.A. (2007) Stapled hemorrhoidopexy is associated with a higher long-term recurrence rate of internal haemorrhoids compared with conventional excisional haemorrhoid surgery. *Diseases of the colon and rectum* 50, 1297–305.

Johanson, J.F., Sonnenberg, A. (1990) The prevalence of haemorrhoids and chronic constipation: an epidemiologic study. *Gastroenterology*. 98, 380–6.

Johnston, L.G., Sabin, M.L., Prybylski, D., Sabin, K, McFarland, W., Baral, S., et al. (2016) Policy and practice: the importance of assessing self-reported HIV status in bio-behavioural surveys. *Bull World Health Organization* 94, 605–61

Kayamba, V., Nicholls, K., Morgan, C., Kelly, P. (2018)A seven-year retrospective review of colonoscopy records from a single centre in Zambia.*Malawi Medical Journal*30, 17–21.

Kołodziejczak, M., Święcki, P., Kucharczyk, A.,Firląg-Burkacka, E. (2014) Proctological treatment of HIV-infected patient. *Nowa Medycyna* 2, 51-57

Lyamuya, E.F., Aboud, S., Urassa, W.K., Sufi, J., Mbwana, J., Ndugulile, F, et al. (2009) Evaluation of simple rapid HIV assays and development of national rapid HIV test algorithms in Dar es Salaam, Tanzania. *BMC Infectious Disease* 9, 19

Mansoor-Khan, R. (2015)Prevalence of Fissure-in-Ano among the Patients of Anorectal Complaints Visiting Nium Hospital. *Journal of Community Medicine & Health Education* 5, 3–6

Mayala, V., Mshana, S.E., Chalya, P.L., Dass, R.M. (2010) Prevalence of HIV infection among trauma patients admitted to Bugando Medical Centre, Mwanza, Tanzania and its influence on Outcome. *Tanzania Journal of Health Research* 12, 1–9.

Melbye, M., Sprogel, P. (1991)Aetiological parallel between analcancer and cervical cancer. *Lancet* 338, 657-9.

Miles, A.J.G., Connolly, G.M., Barton, S.E. (1991) Persistent ulceration of the anal margin in homosexuals with HIV infection.*Journal of the Royal Society of Medicine* 84, 87-8

Milligan, E.T.C., Morgan, C.N., Jones, L., Officer, R. (1937)Surgical anatomy of the anal canal, and the operative treatment of haemorrhoids. *Lancet* 230, 1119–24.

Mkony, C., Kwesigabo, G., Lyamuya, E. &Mhalu, F. (2003) Prevalence and clinical presentation of HIV infection among newly hospitalized surgical patients at Muhimbili National Hospital, Dar es Salaam, Tanzania. *East and Central Africa Journal of Surgery* 80: 640–645.

Nadal, S.R., Manzione, C.R., Galv~o, V.M., Salim, V.R.B.M., Speranzini, M.B. (1999) Perianal diseases in HIV-positive patients compared with a seronegative population. *Diseases of the Colon and Rectum*42, 649-654.

Nelson, R.L., Abcarian, H., Davis, F.G., Persky, V. (1995) Prevalence of benign anorectal disease in a randomly selected population. *Diseases of the colon and rectum.* 38, 341–4.

Oh, H.K., Moon, S.H., Ryoo, S., Choe, E.K., Park, K.J. (2014) Results of surgical treatment on benign anal diseases in Korean HIV-Positive patients. *Korean Journal of Medical Science* 29, 1260–1265.

Oughriss, M., Yver, R., Faucheron, J.L. (2005) Complications of stapled hemorrhoidectomy: a French multicentric study. *Gastroentérologie Clin Biol.* 29, 429–33.

Safavi, A., Gottesman, L., Dailey, T.H. (1991) Anorectal surgery in the HIV+ patient: an update. *Diseases of the Colon and Rectum* 34,299-304.

Tan, A.X., Kapiga, S., Khoshnood, K., Bruce, R.D. (2015) 'Epidemiology of Drug Use and HIV-Related Risk Behaviors among People Who Inject Drugs in Mwanza, Tanzania' *PLoS ONE* 10, e0145578

Tanzania HIV Impact Survey (THIS). (2017) Summary Sheet: Preliminary Findings 2016-2017. 2016–7.

Wexner, S.D., Smithy, W.B., Milsom, J.W., Dailey, T.H. (1986) The surgical management of anorectal diseases in AIDS and pre-AIDS patients. *Diseases of the Colon and Rectum* 29, 719-23.