

## The Prevalence and Associated Factors of Perianal Abscess Among Patients Visiting Surgical Emergency Department at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia

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Perianal abscess; Prevalence; Risk factors; Ethiopia

### Abbreviations:

BMI: Body mass index; HIV: Human immunodeficiency virus; BP: Blood pressure

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## 1. Abstract

**1.1. Introduction:** Perianal abscess is a benign but common clinical condition that may cause substantial discomfort to suffering patients and carries a significant burden on healthcare services. The prevalence and risk factors of perianal abscess in Ethiopia were not, however, known prior to the time of this investigation. The purpose of the current study is to determine the frequency of perianal abscesses and their risk factors among patients who visit our university hospital's surgical emergency department.

**1.2. Method:** A cross-sectional study design was employed at our hospital from January 1, 2023, to April 30, 2023, G.C., among patients who visited the surgical emergency department [OPD], among 410 patients visiting the surgical emergency department. Multivariable logistic regression analysis was fitted, and the corresponding adjusted odds ratio [AOR] and 95% CI were used to identify factors associated with perianal abscess. The level of significance was declared at a value of less than 0.05.

**1.3. Results:** A total of 410 patients were included in this study. Nearly half [48.29%] of the participants were in the age group of 21 and 35 years, with a median age of 27 and an IQR of 21 and 37 years. Most of the patients [97%] had a BMI within the normal range. 11% and 7% of the patients were alcoholics and smokers, respectively. The prevalence of perianal abscess among the study

participants was 8.3%. From the multivariable logistic regression, HIV infection [AOR =2.56; 95%CI: 2.23–9.46], diabetes [AOR =3.54; 95%CI: 1.926–13.544], and previous history of anorectal abscess [AOR =4.03; 95%CI: 2.450–10.5141] are significantly associated with perianal abscess.

**1.4. Conclusion:** Based on the present study, the prevalence of perianal abscess among patients presented at our hospital was 8.3%. Diabetes mellitus, retroviral infection [HIV], and a previous history of perianal abscess have been identified as the key predisposing factors for perianal abscess.

## 2. Introduction

The line separating the anoderm from the skin of the anal edge is known as the anal verge. The specialised squamous epithelium known as the anoderm has a robust vascular supply and is extensively innervated while lacking secondary skin appendages like hair follicles and sweat glands. The dentate [pectineal] line is located halfway up the anal canal. The real mucocutaneous connection between the viscerally innervated columnar epithelium proximally and the somatically innervated squamous epithelium distally is indicated by this. Parks and Eisenhammer's seminal research found anal glands at the level of the dentate line and showed that these glands are the cause of the majority of perianal abscesses and fistulas [1, 2, 3]. A localized collection of contaminated fluid

is known as an abscess. Although the various anorectal abscesses have precise anatomic definitions, initial management is typically the same, leading to the term “perianal abscess” being commonly used [4]. An acute infection of the soft tissues surrounding the anus may be seen as a perianal abscess. “Non-specific infection” or so-called “cryptoglandular infection” is the most common cause of perianal abscesses [5]. A perianal abscess may track up into and via the levator musculature, which is less common, or it may extend into the ischiorectal fossa and finally create a horseshoe-shaped collection. Perianal abscess is a widespread issue that considerably increases the everyday surgical load [6].

According to a study conducted in Sweden, perianal abscess prevalence was 20/100,000 year. A comparable incidence has also been recorded from Germany [7, 8]. Perianal abscesses are more common in males than in females, and they affect younger people more frequently than older ones. Although the cause of the association with gender and age is still unknown, it could be explained by either hormonal or anatomic variations in the anal glands [9]. There is evidence that oestrogen and testosterone have opposite effects on pro-inflammatory cytokines, while testosterone enhances them [10]. Smoking, obesity, and illnesses like inflammatory bowel disease [Crohn’s disease], which are known to impair the immune system, are additional risk factors for perianal abscess development [11,12]. Diabetes and inadequate glycemic control were linked to an increase incidence of perianal abscess [12]. Patients with an acute anorectal abscess should receive prompt incision and drainage treatment. The use of antibiotics in the treatment of simple perianal abscesses is limited [13].

Perianal abscesses result in a significant burden on healthcare systems due to the associated morbidity and cost of treatment. The need for surgical interventions, prolonged hospital stays, and the risk of recurrence pose substantial challenges for healthcare providers. Furthermore, the management of perianal abscesses often requires multidisciplinary collaboration involving surgeons, radiologists, and infectious disease specialists, influencing the allocation of healthcare resources. Reporting on perianal abscess prevalence and risk factors may be important to policymakers and medical professionals. The prevalence and risk factors of perianal abscess in Ethiopia were not, however, known prior to the time of this investigation. The purpose of the current study is to determine the frequency of perianal abscesses and their risk factors among patients who visit the Surgical Emergency Department. Last but not least, the results of this study have significant ramifications for estimating the illness burden and formulating national health care policy.

### 3. Methods and Material

#### 3.1. Study Design, Setting and Population

A cross-sectional study design was employed at a Comprehensive

Specialized Hospital from January 1 2023 to April 30, 2023 G.C among patients who visited the surgical Emergency department [OPD].

This article has been reported in line with the STROCSS criteria [14].

#### 3.2. Sample Size Determination

The required sample size of the study was determined using a single population proportion formula by considering the 18% prevalence rate of perianal abscess from the study conducted in Saudi Arabia [15]  $Z$  = the level of statistical significance with a 95% confidence interval [CI] of 1.96 and a precision level of 0.05. Then, the minimum sample size obtained was 250 [the calculated sample size was 227]. After adding 10% to account for nonrespondents, it became 250. However, we included 410 study participants in the study. A systematic random sampling technique [i.e., every two patients] was employed to select the study participants.

#### 3.3. Data Collection

Data were collected by administering a structured questionnaire through a face-to-face interview, and clinical data were collected using a data extraction sheet from the patient’s medical charts. Three data collectors and one supervisor who are health professionals were recruited. Data on sociodemographic traits, clinical conditions, and behavioural aspects were gathered. The supervisor and the data collectors received a full day of instruction on data collection techniques.

#### 3.4. Variables of Measurement

The perianal abscess served as the study’s outcome variable. Patients with perianal abscesses were identified based on their history, physical examination, which may have included anaesthesia, and, if necessary, ultrasound. Senior surgical residents [under strict supervision] and surgeons made the clinical diagnosis. Blood pressure [BP] was measured three times in a sitting position using a standard mercury sphygmomanometer BP cuff with the appropriate cuff size that covers two-thirds of the upper arm after the participant rested for at least five minutes and no smoking or caffeine 30 minutes before measurement. The second and third measurements were taken five to ten minutes after the first and second measurements, respectively. Finally, the average of the three BP measurements was calculated to determine the BP status of the participant. An individual was diagnosed as hypertensive if systolic blood pressure [SBP] is  $\geq 130$  mmHg or diastolic blood pressure [DBP] is  $\geq 80$  mmHg, or if there was a previous diagnosis of hypertension or current use of the anti-hypertensive drug [16]. BMI was computed by dividing weight in kilogrammes by height in square metres after using calibrated equipment to measure weight and height. BMI  $< 18.5$  kg/m<sup>2</sup> was considered underweight. 18.5-24.9 kg/m<sup>2</sup> as normal, 25-29.9 kg/m<sup>2</sup> as overweight, and  $\geq 30$  kg/m<sup>2</sup> as obese [17].

### 3.5. Data Processing and Analysis

The data were checked for inconsistencies, coding errors, completeness, clarity, and missing values before they were entered. The data were entered using the EPI Data 3.1 version and exported to the IBM SPSS Statistics 25 statistical software for further data cleaning and statistical analysis. Descriptive statistical analyses such as frequency, percentage, cross-tabulation, median, and interquartile range [IQR] were performed. Multivariable logistic regression analysis was fitted, and the corresponding adjusted odds ratio [AOR] and 95% CI were used to identify factors associated with perianal abscess. A p-value < 0.05 was used to characterize statistically significant results. The Hosmer-Lemeshow-Lemeshow

show used to assess the goodness of fit of the model.

## 4. Results

### 4.1. Sociodemographic Characteristics

A total of 410 patients were included in this study. Nearly half [48.29%] of the participants were in the age group of 21 and 35 years, with a median age of 27 and an IQR of 21 and 37 years. Most of the patients [97%] had a BMI within the normal range. 11% and 7% of the patients were alcoholics and smokers, respectively. Of the total study subjects, 26 [6.3%] and 17 [4.1%] had HIV infection and diabetes mellitus, respectively, whereas nearly 2% had a history of Crohn's disease. (Table 1-4).

**Table 1:** Demographics of patients in the study (n-410)

Variables	Categories	Frequencies (n)	Percentage (%)
Sociodemographic factors			
Age in years	Less than 18	73	17.8
	18-40	166	59.5
	41-60	65	15.8
	Greater than 60	28	6.8
Sex	Male	305	74.4
	Female	105	25.6
Residence	Urban	291	71
	Rural	119	29
BMI	Low	10	2.4
	Normal	393	95.8
	High	7	1.7
Behavioral factors			
Alcohol drink	Yes	46	11.2
	No	364	88.8
Smoking	Yes	28	6.8
	No	282	93.2
Comorbidities			
Diabetes	Yes	17	4.1
	No	393	95.9
HIV infection	Yes	26	6.3
	No	386	93.7
Hypertension	Yes	9	2.2
	No	401	97.8
Inflammatory bowel disease	Yes	7	1.7
	No	403	98.3
BPH	Yes	22	5.4
	No	398	94.6

**Table 2:** Bivariable and Multivariable analysis of factors associated with perianal abscess

Variables	Categories	Perianal abscess		COR (95%CI)	P-Value	AOR (95%CI)	P-Value
		Yes	No				
Sociodemographic factors							
Residence							
	Urban	26	266	(0.27-1.52)	0.316		NA
	Rural	8	111	1			
BMI							
	Low	3	7	(0.038-1.35)	0.227		NA
	Normal	31	378	1			
Religion							
	Christian	29	252	0.28(0.096-0.816)	0.2	3.595(1.02-12.68)	0.047
	Muslim	4	124	1			
Profession							
	Farmer	6	69	3.833 (0.631-23.23)	0.144		NA
	Merchant	1	39	13(1.015-166.44)	0.49		
	Government worker	3	61	6.44(0.893-46.53)	0.065		
	Household job	2	41	6.88(0.805-58.02)	0.78		
	Student	9	144	5.33(0.94-30.271)	0.059		
	Drivers	12	25	0.633(0.107-3.733)	0.614		
	others	1	7	1			
Behavioral factors							
Alcohol intake							
	Yes	10	37	0.291(0.126-0.673)	0.004	0.90(0.238-3.408)	0.877
	No	24	340	1			
Smoking							
	Yes	7	22	0.28(0.105-0.748)	0.011	1.628(0.341-7.762)	0.541
	No	27	355	1			
Comorbidities							
Diabetes							
	Yes	4	10	2.103(1.71-4.046)	0.058	3.542(1.926-13.544)	0.045
	No	30	367	1			
HIV infection							
	Yes	7	12	1.48(1.52-5.426)	0	2.562(2.23-9.46)	0.005
	No	27	365	1			
IBD							
	Yes	3	4	0.30(0.055-1.633)	0.164		0.999
	No	31	375	1			
Previous history of perianal abscess							
	Yes	8	22	4.951(2.009-12.201)	0.001	4.032(2.450-10.514)	0.013
	No	26	354				

COR: Crude odds ratio, AOR: Adjusted odds ratio, CI: Confidence interval, NA: Not analyzed, when p value >0.2

**Table 3:** Clinical symptoms of patients presented with perianal abscess

Symptoms	Frequency (n)	Percentage (%)
Perianal pain	33	97.1
Perianal swelling	28	82.4
Perianal drainage	20	58.8
Other symptoms (fever, constipation,...)	12	35.3

**Table 4:** Types of perianal abscess observed among patients presented with perianal abscess

Type of Abscess	Frequency	Percentage
Perianal	17	50
ischioanal	11	33
Submucosal	2	5.88
Intersphincteric	2	5.88
Horse-shoe	2	5.88

#### 4.2. Prevalence and Factors Associated with Perianal Abscess

The prevalence of perianal abscess among the study participants was 8.3%. It was more prevalent among patients between the ages of 20 and 40 [59.5%]. Variables with a p-value of less than 0.2 in the univariate analysis were selected for multivariable logistic regression. From the multivariable logistic regression, HIV infection, diabetes, and a previous history of anorectal abscess are significantly associated with perianal abscess. The odds of having a perianal abscess were 2.56 times higher in patients with HIV infection when compared with HIV-negative individuals [AOR =2.56; 95%CI: 2.23–9.46]. Patients who had a previous history of perianal abscess had a four-fold higher risk of having perianal abscess than those without a previous history [AOR =4.03; 95% CI: 2.450, 10.5141]. The odds of developing a perianal abscess among patients who have diabetes mellitus were 3.54 times higher as compared to those who had no diabetes mellitus [AOR =3.54; 95%CI: 1.926, 13.544].

However, we did not find any significant association between profession, religion, residence, BMI, and perianal abscess. Most of the patients affected were males [31, 91%]. Among patients with perianal abscess, 33 [97.1%] of the patients had perianal pain, followed by perianal swelling 28 [82%], and perianal discharge 20 [58.8%]. The most common types of perianal abscesses observed were perianal -17 [50%], ischiorectal [ischioanal] -11 [33%], submucosal -4 [11.7%], and horseshoe type -2 [5.88%]. The mean duration of illness before presentation was 4.65 days, with an SD of 1.97 days. All patients underwent incision and drainage under spinal anaesthesia and were operated on by senior residents [under supervision] and general surgeons. There was one patient with a complication of necrotizing fasciitis, and all patients were discharged and improved.

#### 5. Discussion

Fistulas and anorectal abscesses are frequent surgical disorders. The majority of the individuals with anorectal suppuration, if not all of them, appear to have cryptoglandular etiology. According to Lockhart Mummery in 1929, the anal glands and their ducts enter the anal crypts through the lumen and are likely the cause of an anorectal infection that leads to an abscess [18]. Eisenhammer then proposed that the plain between the internal and external sphincters is typically where the glands, which are branched tubular structures lined with transitional epithelium, finish. Anorectal suppuration originates from an infection in this intersphincteric region that is of cryptoglandular origin. The intersphincteric abscess may remain isolated, or it may progress along the anatomic routes in various directions and present in various places. Perianal, ischiorectal, and intersphincteric are the three locations of anorectal abscesses that are most frequently seen [3,19]. Patients with Crohn's disease [CD] frequently experience perianal disease. Depending on the criteria of perianal disease, the length of follow-up, and

the pattern of the intestinal disease, the frequency of perianal disease has been reported to range from 60 to 80 percent [20]. One study that evaluated the microbiologic characteristics of perianal abscesses found that *E. coli* and *K. pneumoniae* were the most common pathogens isolated [21].

Identifying the risk factors associated with perianal abscesses can assist in early detection, prevention, and overall management of this condition. Certain occupations have an increased risk of developing perianal abscesses due to the nature of their work. For instance, individuals with occupations that require long hours of sitting, such as truck drivers or office workers, may be more prone to developing anal infections due to increased pressure on the perianal region and compromised blood circulation [22], although we didn't find any clinically significant association between profession and perianal abscess in our study. Certain lifestyle choices and habits have been linked to a higher incidence of perianal abscesses. Chronic constipation is frequently associated with the development of anal infections due to increased straining during defecation, which can cause trauma to the perianal region's delicate tissues [12]. Certain genetic variations and polymorphisms have been associated with an increased susceptibility to anal infections and impaired wound healing processes in perianal abscess. These genetic factors can affect the immune response and the recognition of microbial biofilms in the anal region [23, 24].

Fistulous abscesses can develop in either the acute or chronic phases in a patient. Acute pain and swelling in the anal region will be evident in the patient with an abscess. Sitting or moving causes pain, which is typically made worse by urinating or even coughing or sneezing. The common symptoms include fever and malaise. The most frequent presenting symptoms in a study with anorectal suppuration that Vasilevsky and Gordon evaluated were pain [93%], swelling [50%], and bleeding per rectum [16%]. Purulent anal discharge, diarrhoea, and fever were other symptoms [25]. Similar to the above finding, our study also revealed perianal pain [97%], swelling [82%], and discharge [58%]. Typically, a clinical diagnosis of perianal abscess is made. Anal fistulas or recurrences cannot be predicted by the presence of a positive bacteriological culture. Therefore, there is no need to regularly conduct this expensive investigation [26].

A patient with an acute anorectal abscess should receive prompt incision and drainage treatment. The use of antibiotics to treat an uncomplicated anorectal abscess is quite limited. However, patients with substantial cellulitis, underlying immunosuppression, or concurrent systemic disease may be considered for antibiotic treatment. It is not recommended to add antibiotics to the usual incision and drainage of a simple anorectal abscess because it doesn't speed up recovery or prevent recurrence [13]. However, antibiotics are advised preoperatively in patients with prosthetic valves, past infective endocarditis, congenital heart disease, and heart transplant recipients with valve pathology before incision and drainage

of contaminated tissue such as a perianal abscess [27].

Since there was no appreciable difference in fecal incontinence, quality of life, or wound healing scores between needle aspiration with postoperative antibiotics and surgical incision, it is not advised as a substitute for surgical incision in the treatment of acute perianal abscess [9]. Depending on the location of the abscess and the length of follow-up, the overall recurrence rate after straight-forward incision and drainage ranges from 3% to 44%. Compromised initial drainage, inability to remove the loculations from the abscess, missing abscess, and undiagnosed fistula are risk factors for recurrence and the requirement for early repeat drainage. Between 18% and 50% of horseshoe abscesses are persistent or re-occur, which is a particularly high percentage [28]. Suprlevator abscess is a rare form of anorectal disease that can cause superior spread through fascial planes. Abdominal pain is a dominant feature of extraperitoneal inflammation originating from anorectal abscesses, and proper inspection of the patient along with the medical history can lead to a quicker diagnosis and decisive treatment [29]. Aggressive angiomyxoma is a rare case that can present as an ischioanal mass, mimicking a perianal abscess. It can be excised through a perianal approach if localised to the ischioanal fossa, preserving anal sphincter activity [30].

While most abscesses and fistulae recurred within 2 years, 30% of patients experienced a recurrence more than 2 years after the initial treatment. This suggests that recurrent disease that appears within 2 months of treatment results from inadequate initial therapy [31]. The incidence of fistulas in recurrent anorectal abscesses was 76 percent. The incidence of fistulas after perianal abscesses is around 30 percent. We recommend that patients with anorectal abscesses undergo an examination in the operating room under anesthesia [32]. Additionally, one study found that patients with a perianal abscess diagnosis are more likely to later receive diagnoses of Crohn's disease and ulcerative colitis [33].

Finally, based on the guidelines of World Society Emergency Surgery, we advise using a surgical strategy that involves incision and drainage in patients with anorectal abscesses. After an abscess has been drained, packing should not be used. Instead, antibiotics should be administered if sepsis, a soft-tissue infection in the area, immune system problems, or both are present [34].

#### Limitations of the Paper:

- The study design used in this paper was cross-sectional, which limits the ability to establish causality between the identified risk factors and perianal abscess.
- The study was conducted at a single university hospital, which may limit the generalizability of the findings to other settings or populations.
- The sample size of the study was relatively small, with only 410 patients included, which may affect the precision and representativeness of the results.

- potential confounding factors that may have influenced the association between the identified risk factors and perianal abscess

## 6. Conclusion

Based on the present study, the prevalence of perianal abscess among patients presented at this hospital was 8.3%. Diabetes mellitus, retroviral infection [HIV], and previous history of perianal abscess have been identified as the key predisposing factors for perianal abscess. Therefore, we recommend that health care professionals should advise patients at risk of perianal abscess about the symptoms and signs of perianal abscess.

## 7. Declaration

### 7.1. Consent to Publication

Not applicable.

### 7.2. Availability of Data and Material

Data will be available from the corresponding author upon request.

### 7.3. Competing Interests

There is no any competing of interests related with this work.

### 7.4. Funding

Not applicable.

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