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**SOCIODEMOGRAPHIC FEATURES, CLINICAL CHARACTERISTICS  
AND TREATMENT PATTERNS OF INFLAMMATORY BOWEL  
DISEASE IN PATIENTS SEEN AT TIKUR ANBESSA SPECIALIZED  
HOSPITAL DURING THE PERIOD FROM JANUARY - AUGUST 2020  
ADDIS ABABA, ETHIOPIA.**

A Research project submitted to department of Internal medicine, Division of Gastroenterology, School of Medicine, CHS, Addis Ababa University, for the partial fulfillment of internal medicine Specialty Certificate program

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## **SUMMARY PAGE**

### **PROJECT TITLE**

Sociodemographic features, Clinical characteristics and Treatment patterns of inflammatory bowel disease in patients seen at Tikur Anbessa Specialized Hospital (TASH) during the period between January - August 2020, Addis Ababa, Ethiopia.

**THEMATIC AREA:** Gastroenterology

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## **List of Acronyms**

AAU: Addis Ababa University  
ASA: Acetylsalicylic Acid  
ATT: Antituberculous therapy  
AZA: Azathioprine  
CHS: College of Health Sciences  
CD: Crohn's Disease  
EIM: Extra intestinal manifestations  
GI: Gastrointestinal  
IBD: Inflammatory Bowel Disease  
ITB: Intestinal tuberculosis  
6-MP: 6-Mercapto purine  
MTX: Methotrexate  
OPD: Outpatient Department  
SPSS: Statistical Package for Social Science  
TASH: Tikur Anbessa Specialized Hospital  
UC: Ulcerative Colitis  
UGI: Upper gastro intestinal

## ABSTRACT

**Background:** Inflammatory bowel diseases (IBD) include ulcerative colitis (UC) and Crohn's disease (CD). To date there are no reports from Ethiopia at a nationwide or hospital levels about the epidemiology and clinical characteristics of IBD.

**Objective:** To describe the sociodemographic features, clinical characteristics and treatment patterns of IBD in our patients.

**Methods and Materials:** A descriptive study consisted of 102 patients who attended the GI referral clinic in TASH from January - August 2020. Data was gathered through review of medical records and patient interview; and a standardized questionnaire was applied. The collected data was analyzed using SPSS v. 26.

**Results:** A total of 102 IBD patients (29 UC, 73 CD and a ratio of 2.5:1) with female predominance, 57% (n = 58) was identified. The M-to-F ratio was 1:1.2 for CD and 1:1.6 for UC. The mean age at diagnosis was 26.4 years for CD and 33 years for UC. Only 5.9% of patients had a family history of IBD; and no association of smoking with IBD was found. EIMs were reported in 16.6%. In patients with CD, the ileo-colon type was the most common disease phenotype (38%), and the inflammatory type was the most common disease behavior (49.3%); 18.6% ended up in bowel resection. In patients with UC, left-sided colitis was the predominant disease extent (69.0%). Majority of the patients were on steroids and immunomodulators.

**Conclusions:** There was a predominance of females in both IBD subtypes. CD was more common than UC, in comparison to what is mentioned in most literatures and the mean age at diagnosis was in the mid-twenties for the former and early thirties for the later. None of the IBD patients were treated with biologic therapy.

**Key words:** IBD, Crohn's disease, Ulcerative colitis, demography, clinical pattern, TASH, Ethiopia

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# 1. INTRODUCTION

## 1.1. Background

Inflammatory bowel disease (IBD) is characterized by non-infectious chronic inflammation of the gastrointestinal tract. Although the cause of IBD is still not completely understood, IBD is suggested to be a result of uncontrolled immune response to a trigger in genetically prone individuals. The role of environmental factors either as the triggers or causes of the uncontrolled immune response continues to be debated (Alatab et al., 2019).

The peak of IBD's occurrence, followed by a chronic relapsing pattern, usually happens in the second to fourth decade of life, the most productive time of adulthood. IBD can adversely affect all aspects of an individual's life, majorly altering quality of life and increasing morbidity, compared to the general population (Alatab et al., 2019).

IBD primarily encompasses Crohn's disease (CD) (which can affect any segment of the gastrointestinal tract from the mouth to the anus) and ulcerative colitis (UC) (involves exclusively the rectum and colon). Approximately 7% to 10% of IBD falls into the ill-defined category of indeterminate colitis (Sairenji, Collins, & Evans, 2017).

Despite sharing some characteristics, these conditions can be distinguished by differences in genetic predisposition, risk factors; and clinical, endoscopic, histologic and radiologic features are used to diagnose one from another (Sharara et al., 2018). Patients with UC and colonic CD most commonly present with chronic diarrhea, per rectal bleeding and accompanied by abdominal pain. On the other hand, ileocolonic CD mainly manifests as abdominal pain localized at periumbilical or right lower quadrant, with or without watery diarrhea. Vague abdominal pain might be the only symptom for small bowel CD, though more extensive small bowel involvement will cause postprandial abdominal pain, nausea, vomiting and watery diarrhea. In contrast to UC, perianal disease such as perianal abscess, fistula and fissure can occur in CD. (Lumpur et al., 2019).

Extra intestinal features for IBD include fever, weight loss, arthralgia, mucocutaneous lesions such as oral ulcers, erythema nodosum, pyoderma gangrenosum and ophthalmologic complications like episcleritis, iritis and uveitis (Lumpur et al., 2019).

Traditionally, IBD has been regarded as a disease of high-income nations, but a shift in the epidemiological pattern has been reported, indicating stabilizing incidence in high-income countries with a high burden and prevalence, and a rapid rise in newly industrialized countries in South America, eastern Europe, Asia, and Africa (Alatab et al., 2019). It has been considered a problem in industrial-urbanized societies and attributed largely to a Westernized lifestyle and other associated environmental factors. Despite limited epidemiological data from developing nations, its incidence and prevalence in developing countries is steadily rising and has been attributed to the rapid modernization and Westernization of the population (Koma, n.d.).

The prevalence of IBD in the Western world is up to 0.5% of the general population, and IBD is now a global disease (Kaplan, 2015). Many studies have shown a varying incidence and prevalence among different geographic and ethnic populations. The highest incidences of CD and UC have been reported in northern Europe and North America. Lower incidence has been reported in Southeast Asia; and have always seemed to be rare in the Middle East and sub-Saharan Africa (Alatab et al., 2019). The number of patients with IBD in newly industrialized countries might approximate that in the Western world in 2025 owing to rising prevalence and rapidly growing populations (Kaplan, 2015).

Most data have shown that UC is more common than CD, although this trend might be changing in some countries. The incidence of IBD is rising in countries in which it had rarely been previously reported. In a recent review of the natural history of IBD, it was noted that as countries become Westernized, the incidence of UC increases first and is later followed by CD (Esmat, Nady, Elfekki, Elsherif, & Naga, 2014).

Diagnosis of IBD relies on a combination of history, physical examination, laboratory testing, and endoscopy with biopsy (the gold standard for diagnosis and differentiation of IBD). Treatment goals for IBD are to minimize symptoms, improve quality of life, and minimize progression and complications of disease (Sairenji et al., 2017).

IBD can impact all areas of patients' lives: school, work, social, and family life, as disease occurs during the most productive time of life and recurs with chronic relapsing patterns. A patient-centered approach with strong multidisciplinary care can result in an improved quality of life for patients of all ages (Sairenji et al., 2017). In 2025, accessibility, affordability, variation in health-care resources and the cost of biologic agents could strain health-care systems and exacerbate disparity of care across the world (Kaplan, 2015).

## **1.2. Statement of the problem**

IBD has been thought to have a low incidence and prevalence in black populations of sub-Saharan Africa mainly because of the sporadic cases reported from the continent in comparison with the large numbers reported from the North America and Western European countries (Abdulla et al., 2017). Understanding on the demography and clinical manifestations of IBD in different geographic areas can provide thorough insight into the possible risk factors and mechanisms that contribute to the occurrence of IBD. Due to its chronic unstable characteristics and unknown etiology, identifying the epidemiological and clinical characteristics can promote diagnosis and earlier clinical intervention. Moreover, describing the epidemiology of IBD is important for appreciating the public health burden it causes and for planning appropriate health services for persons with IBD (Fallahi, Moazzami, Tabatabaeiyan, Zamani, & Asgar-, 2009).

There are special situations in the differential diagnosis of IBD in developing countries, because intestinal infectious diseases that mimic IBD are still common in these population. Thus, intestinal infectious diseases should always be excluded before making the diagnosis of IBD in these patients. The differentiation of CD with intestinal tuberculosis, in particular is important, but it is sometimes difficult (Hu & Ali, 2015).

In the context of Africa where there are several other causes of mucoid bloody stool, the diagnosis of IBD can only be made as a diagnosis of exclusion. Majority of patients present late with severe disease due to the fact that the disease had been neglected due to inaccurate diagnosis and inappropriate treatment.

A pattern of severe delayed clinical presentation of IBD yet medically responsive to therapy and low surgical intervention has been reported from studies in Ghana, Sudan and Blacks in South Africa. This may signify a peculiar clinical paradox in these traditionally low incidence populations (Archampong & Nkrumah, 2013).

Findings from tertiary hospitals in some African countries like Nigeria, Egypt and Tunisia suggested IBD may be more common in this part of the world than previously thought; and that there is usually a long delay in establishing the diagnosis (Alatise et al., 2012; Ouakaa-Kchaou et al., 2013). An index report from three large gastroenterology units in Nigeria showed that IBD may not be uncommon as it was previously stated. Unlike data from the developed countries where early onset IBD account for only 25% of cases, early onset IBD was seen in 75% of the patients in a report from Nigeria (Alatise et al., 2012).

It is important to understand the trend of disease subtype and characteristics among different races and ethnicities because this information may help inform the prognosis and management of IBD. Although several studies have assessed the differences in incidence of IBD subtype and disease phenotype among different racial/ethnic migrants worldwide (Molodecky et al., 2012).

There is a need to reconcile the most appropriate treatment for these patient populations from the perspectives of both disease presentation and cost. In the West, biological agents are the fastest-growing segment of the prescription drug market. The healthcare systems, and certainly the patients, in developing countries will struggle to afford such expensive treatments. The need for biological therapy will inevitably increase dramatically, and the pharmaceutical industry, healthcare providers, patient advocate groups, governments and non-governmental organizations should come to a consensus on how to handle this problem (Koma, n.d.) .

The limited information on the sociodemographic and clinical profile of IBD patients in sub-Saharan African countries is a significant shortcoming. The reported seemingly lower incidence of IBD in developing nations might be due to the limited access to diagnostic facilities. Thus, extrapolations from the aforementioned few reports from African countries may alert us IBD may not be a rare health problem in our country too.

In our country including TASH no research has been done on this topic. This study is therefore, aimed at describing the sociodemographic features, clinical profile and treatment pattern of IBD patients being treated and followed at TASH; and to compare them to the data of the literature.

Given differences in the epidemiology, clinical characteristics, management of IBD between patients across different countries and diverse ethnic groups worldwide, this study will give insight into the demography, clinical profile and treatment pattern of IBD in our population which could be useful for health care workers in prompt diagnosis and appropriate treatment of this globally emerging disease.

### **1.3. Significance of the study**

Though there were sufficient data gathered worldwide on IBD and a few more in the continent of Africa, to date there are no reports from Ethiopia at a nationwide or hospital levels about the epidemiology and clinical characteristics of IBD. We hope this study could pave the way for further studies; and serve as a basis for a continuous research in the field of gastroenterology to better determine the sociodemographic and clinical characteristics of IBD in our country. The information provided in this study could be crucial for clinicians and health policy makers to prepare their clinical infrastructure and educate specialized personnel to be able to confront the burden of this complex, and socially and economically costly disease. Moreover, knowledge of the real epidemiological and clinical profile will aid us in the development of efficacious health care strategies and keep us alert to opportune diagnostic possibilities.

## **2. LITERATURE REVIEW**

### **2.1. The Epidemiology and Disease Burden of IBD**

Traditionally viewed as a disease of western countries, studies indicated burden of IBD is on the rise in developing countries and is mimicking the rise which was observed in the western countries. It is believed that the burden of UC is twice that of CD in developing as compared to the West. The rise in UC appeared to be more marked compared to the rise in CD (Kedia & Ahuja, 2017; Mansour-Ghanaei et al., 2015).

Studies from African and Middle Eastern countries suggest disease trends similar to the West, and an important health and economic burden (Molodecky et al., 2012). Studies from some developing Asian countries like Iran, India and Saudi Arabia indicated that the incidence of IBD has been gradually increasing (Aljebreen et al., 2014; Mansour-Ghanaei et al., 2015).

An epidemiologic study conducted in a Tunisian hospital over 15 years noted an increase in the frequency of IBD cases over time, with 21 cases diagnosed during 1991–1993 compared with 43 in 2003–2005 (Ouakaa-Kchaou et al., 2013). Similarly, a report from Accra, Ghana showed a 65% rise in incidence of IBD in 2004–2011, compared with 1997–2004 (Archampong & Nkrumah, 2013).

Numerous studies which have been directed on the epidemiology of IBD; show considerable differences on geographical incidence. Various geographical differences and time trends in the occurrence rates of IBD in a given region may create insights into conceivable etiological factors. Geographical location plays a potential role in IBD development and in phenotype and course of the disease (Zobeiri et al., 2017).

In a Patient-reported qualitative study conducted to identify the impacts of IBD and its management, IBD symptoms cause immediate disruption in activities, but patients may continue to experience some symptoms on a chronic basis

IBD symptoms caused immediate disruption of activities but also had ongoing impacts on daily activities, including dietary restrictions, lifestyle changes, and maintaining close proximity to a toilet. More distal impacts included interference with work, school, parenting, social and leisure activities, relationships, and psychological well-being (Devlen et al., 2014).

## **2.2. Sociodemographic Features**

IBD in the West is characteristically associated with a bimodal age distribution pattern, with a peak at age 20-39 years and a second smaller peak at 60-79 years; such bimodal distribution has not been consistently observed in studies done in developing nations. In European and North American studies, UC is equally frequent in men and women at all ages while studies of CD have consistently revealed a greater incidence in women than men CD (Makharia et al., 2012).

Different frequencies of IBD in male and female with a varying mean age at diagnosis were reported from different studies. In a Survey of Inflammatory Bowel Diseases in India which included 1159 patients, 64.3% had UC, 35.3% with CD, and 0.4% with indeterminate colitis. The mean age of patients with UC and CD was 38.5 and 35.9 years. The male-to-female ratio was 1.4 in UC and 1.3 in CD (Makharia et al., 2012). A greater percentage of patients with CD had undergone appendectomy and other intra-abdominal surgery compared to those with UC. A definite history of IBD in one or more family members was present in 2.9% overall (UC 2.3% and CD 4.6%) (Makharia et al., 2012).

A male predominance has also been reported in the incidence of UC in other Asian studies (Ahuja & Tandon, 2010a). In contrary, a report from Iran, a developing country, showed that UC was slightly more common in female (Mansour-Ghanaei et al., 2015). In this study, among 868 patients with IBD, 87.1% diagnosed as UC and 12.9% as CD. The mean age of patients with UC and CD was  $46.73 \pm 15.79$  and  $40.15 \pm 14.27$  years respectively. Male/female ratio in UC and CD was 0.92:1 and 0.75:1 respectively. Positive family history of the disease was observed in 25.6% of patients and 66.6% had four or more family members. Extra intestinal manifestations were seen in 25.4% of patients with IBD (Mansour-Ghanaei et al., 2015)

Retrospective analysis of UC and CD in Malaysia done over a period of 40 years showed a male predominance 61.5%. UC was slightly more common in male as compared to female (male to female ratio was 1.9:1), while CD occurred equally in both (male to female ratio was 1.2:1). Most of IBD patients were non-smoker (UC: 76.9%, CD: 70.5%) and had tertiary education (UC: 71.2%, CD: 67.4%). The mean age of diagnosis was 41.2 years for UC (46.6% were middle-aged adults [36–55 years] at the time of diagnosis) and 27.4 years for CD (53.8% were young adults [19–35 years] at the time of diagnosis) (Lumpur et al., 2019).

Studies from three teaching hospitals in Southern Nigeria done with the aim of highlighting the demography of patients with IBD seen 66.7% males and 33.3% females and had ages ranged from 18 years to 80 years with a median of 26.5 years. Majority (66.7%) of patients had UC while 33.3% had Crohn's disease (Alatise et al., 2012). Similarly, a male preponderance was observed/noted in another single center study done in Ghana (Archampong & Nkrumah, 2013). However, retrospective analysis of IBD registry data from a teaching hospital in Accra showed the majority of patients (83%) were females, 50% were young aged between 21-30 years (Nkrumah et al., 2008). In contrary to reports from Asian countries, diagnosis of IBD at an early age is seen in African countries and variable sex distribution.

Unlike in the West where smoking has been shown as a risk factor in the development of CD and where it also negatively influences the natural history of CD, studies from few developing Asian countries including India have not reproduced these results. In these studies, there was no relationship between smoking and severity as well as long-term outcomes of patients with of IBD (Kedia & Ahuja, 2017).

### **2.3. Clinical characteristics of inflammatory bowel disease**

To date, only a few hospital-based studies have described the clinical characteristics of the disease and treatment outcomes of IBD in Africa. Despite this being the same condition afflicting both Western and developing populations, there are several significant variations in its phenotype, possibly as a result of the differences in genetic composition and environmental influences (Ng, Wong, & Ng, 2016).

A review from Asian studies showed that Many of the clinical manifestations of IBD in Asia share similar characteristics to patients in the West. Nonetheless, there are several notable differences that are relevant to physicians (Ng et al., 2016).

A large-scale population-based study from Asia aimed to compare the clinical pattern of IBD with that of Western countries found that the ratio of UC to CD was 2:0 as compared to 0.5 in Australia, a developed country. Complicated CD (stricturing, penetrating, or perianal disease) was more common in Asia than Australia (52% vs 24%), and a family history of IBD was less common in Asia (3% vs 17%). The study concluded that IBD could be as severe or more severe in Asia than in the West (Ng et al., 2013).

In a survey of Inflammatory Bowel Diseases in India which included 1159 patients, median duration of illness in patients with CD was 48 months higher than in those with UC 24 months. There was no difference in the median time interval from onset of symptoms to the first diagnosis in both groups of patients (Makharia et al., 2012). Chronic diarrhea, blood in stool, anorectal pain and pedal edema were significantly more common in patients with UC in comparison to CD. On the other hand, abdominal pain, perianal fistula, fever and presence of abdominal mass were significantly more common in CD. More than a half of the patients surveyed had one or more EIM; Joints pain with or without arthritis was present in 33.2% and 26.3% of patients with UC and CD, respectively (Makharia et al., 2012). The location of CD was colon 41%, terminal ileum 32%, and ileo-colon 23%; the upper GI tract was involved in 4%. In this study 19% had stricturing disease; fistulizing disease was rather uncommon (4.4%) (Makharia et al., 2012).

In another single center study from India, the overall prevalence of any EIM and multiple EIMs in UC and CD was 33.2 versus 38.3% and 6.9 versus 4.7%, respectively. The prevalence of EIMs in Western studies has varied from 36 to 52% for UC and from 24 to 42% for CD, with the prevalence of multiple EIMs being reported as 6%. The most common EIM reported in both UC and CD was peripheral arthropathy (Kedia & Ahuja, 2017).

According to a single descriptive study from Iran aimed to review the clinical characteristics of IBD; diarrhea, hematochezia and bloody diarrhea were the most common symptoms in UC patients. The predominant form of UC was left-sided colitis, and exclusive proctitis was uncommon; and CD was confined to colon predominantly. A similar incidence of EIMs to western countries was noted. Musculoskeletal disorders were the most common EIM and the knee was affected more than other joints (Balaii et al., 2015).

Studies from African countries include data from Egypt, Nigeria and Ghana. A retrospective analysis of medical records for the period 2004 to 2011 from a single center in Accra, Ghana assessed the pattern of patients diagnosed with IBD during this period. Presentations of severe diarrhea was 55.6%. Eighty-two percent (82%) of patients with IBD had a severely inflamed colon on the index colonoscopy. Most patients with IBD were presenting late with severe clinical and endoscopic features of disease yet medically responsive (Archampong & Nkrumah, 2013).

Another retrospective study from a teaching hospital in Accra showed the duration of symptoms before diagnosis ranged between 1-15 years; nearly 50% had symptoms for 1-5 years before diagnosis was established. 83% had bloody stools but 39% had experienced constipation at some stage during their illness. Endoscopy with tissue biopsy was performed and was abnormal in 83.3% of patients (Nkrumah et al., 2008). Similarly, Reports from Nigerian hospitals showed majority of IBD patients (83.3%) had severe disease with main clinical features being recurrent diarrhea and passage of mucoid bloody stools. One patient died following the occurrence of toxic megacolon (Alatise et al., 2012).

## **2.4. Course and Treatment of IBD**

Although diagnosis of CD versus UC follows a similar pathway, treatment of these diseases differs significantly and is considered individually (Sairenji et al., 2017). With no available cure, IBD is managed by medication and changes in lifestyle, which include changes in diet, reducing stress, and ensuring sufficient sleep to minimize the likelihood of worsening symptoms or initiating a flare (Devlen et al., 2014).

Treatment goals are to minimize symptoms, improve quality of life, and minimize progression and complications of disease. The potential negative consequences of toxic immunosuppressive and anti-inflammatory drugs must be considered in treatment decisions (Sairenji et al., 2017).

The management of IBD within developing countries is challenging, with the need to improve early diagnosis, access to healthcare, and patient education, along with facilitation of access to treatment options and improvement of medication adherence (Sharara et al., 2018).

Concerning the treatment regimens, 5-ASAs and corticosteroids are highly preferred for the treatment of IBD according to a study from Asia. Concerning the use of immunomodulators, the study demonstrated that immunomodulators were more often prescribed in patients with CD than in those with UC, which is comparable to the findings of other reports from the same continent (Chou et al., 2019).

The difficulty in differentiating IBD, CD in particular, from intestinal tuberculosis has shown a treatment challenge in developing nations. Intestinal TB is a close mimic of CD, and it is often difficult to differentiate the two diseases on the basis of clinical, endoscopic, histological, and radiological characteristics. According to a report from India, significant number of patients have received a prior antituberculous treatment (ATT). It indicated that 36.7% patients with CD and 7.8% with UC had received antitubercular drugs before the diagnosis of respective disease was made. In those with established diagnosis, approximately two-thirds of patients with UC and CD had received corticosteroids. More patients with CD (62.9% vs 29.8%) had received azathioprine (AZA); other immunosuppressants such as methotrexate were used in only a minority of patients. Infliximab also was used in only a minority of patients with UC and CD (Makharia et al., 2012).

In another review from the same country, approximately two thirds of all UC patients had received steroids, 30% had received azathioprine (AZA), and less than 1% of all patients had received biologics (Kedia & Ahuja, 2017). In patients with CD, the medications used were 5-aminosalicylic acid (5-ASA) compounds in 78% of patients, steroids in 42% of patients, AZA in 29% of patients, and methotrexate in 2% of patients. The rate of biologics use was only 2% of all patients only and 37% of patients with CD required surgery.

Another important finding that is visible in the review was the use of ATT in 37% of all patients. This dilemma often leads to a therapeutic ATT trial because CD-specific therapy (i.e. steroids) can be disastrous if a patient has ITB.

In a retrospective design study to access clinical details of follow-up patients attending the Gastroenterology Unit of the Korle-Bu Teaching Hospital, Accra showed most patients (70–80%) responded to medical therapy (steroids, sulfasalazine) with no colon resections for steroid-refractory colitis. Most patients with IBD were presenting late with severe clinical and endoscopic features of disease yet medically responsive (Archampong & Nkrumah, 2013). Similarly, A retrospective review of charts of IBD seen between January 2007 and June 2010 at three teaching hospitals in Southern Nigeria showed that all the patients had treatments with sulphasalazine or mesalazine, steroids and antibiotics with good responses (Alatise et al., 2012).

Regarding the course of IBD, in a report from Indian survey both diseases were characterized by intermittent flares in many patients. Intermittent flares were more common in CD, while a pattern of chronic continuous disease was more common in UC. In this review, one third of the patients had a chronic active course, one half had a relapsing remitting course; and 4% of patients with UC had undergone colectomy while 15.2% of patients with CD underwent surgical intervention. The data indicated that the overall colectomy rates were lower in Indian patients as compared to patients in the West, indicating a slightly milder disease in India (Makharia et al., 2012).

More than 80% of patients with both diseases remained on indefinite medical treatment. Discontinuation of medical treatment was more common in UC (17.5%) compared to CD (6.9%). In addition to the nature of the disease, the level of education, compliance, and affordability of treatment are factors that affect the course of the disease (Makharia et al., 2012).

### **3. OBJECTIVES**

#### **3.1. General objective**

- The purpose of this study is to describe the sociodemographic features, clinical characteristics and treatment patterns of inflammatory bowel disease in patients seen at TASH during the period between January - August 2020, Addis Ababa, Ethiopia.

#### **3.2. Specific objectives**

- To describe the sociodemographic features of inflammatory bowel disease (IBD)
- To identify the clinical characteristics of IBD
- To review past and current treatment patterns

## **4. METHODOLOGY**

### **4.1. Study setting**

#### **4.1.1. Study area**

The study was conducted in GI referral clinic at Tikur Anbessa specialized hospital, which is the main tertiary referral center in Ethiopia located in the capital, Addis Ababa. TASH provides specialized and comprehensive medical care to the immediate community and beyond who are referred for specialty consultations and/or interventions. It is also a teaching hospital for the Addis Ababa University, College of Medicine and Health sciences and is involved in undergraduate, postgraduate and fellowship trainings in different fields of clinical medicine.

#### **4.1.2. Study period**

The study was conducted on IBD patients having follow-up from January 2020 to August 2020.

### **4.2. Study Design**

A cross sectional descriptive study was conducted to describe the sociodemographic features, clinical characteristics and treatment pattern of IBD in patients attending the GI outpatient clinic, at Tikur Anbessa Specialized hospital (TASH).

### **4.3. Source and Study population**

All patients seen at the GI outpatient clinic of TASH during the specified study period.

The study population of this study was all patients seen at TASH with diagnosis of IBD on follow-up

### **4.4. Sample size and Sampling technique**

Convenience sampling method was used. The predicted number of patients attending GI referral clinic during the study period is less than 10,000. A total of 148 with an established diagnosis of IBD (UC or CD) were seen at the GI clinic over 6 months period. The required sample size for the study is shown below.

$$n = \frac{\frac{Z^2 p(1-p)}{d^2}}{1 + \frac{1}{N} \left( \frac{Z^2 p(1-p)}{d^2} \right)}$$

Where,

P is the (estimated) proportion of the population, 50%, given lack of previous studies

N is population size (a total of 148 patients seen over 6 months period)

$Z^2 * p(1-p)/d^2$  (Cochran's formula) = 0.9604

n = 73

A sample size of 73 patients was calculated assuming CI of 95% and degree of freedom of 0.05.

Given the total population is less than 10,000, the final corrected sample size after 10% was added for possible dropout is 80 (the minimum sample size required).

## **4.5. Inclusion and exclusion criteria for patients**

### **4.5.1. Inclusion criteria**

- ✓ Age 18 years and above during the study period
- ✓ Any patient with confirmed IBD (both new and follow up patients)
- ✓ Only IBD patients who had undergone a full colonoscopy and biopsy was taken
- ✓ Patients who gave informed consent

### **4.5.2. Exclusion criteria**

- ✓ Individuals whose chart is lost/incomplete
- ✓ Patients who do not have undergone an ileocolonoscopy and biopsy was not taken
- ✓ Diagnosis was doubtful after full investigations/Suspected IBD

## **4.6. Study Variables**

### **4.6.1. Dependent variables**

- ✓ IBD- UC, CD

### **4.6.2. Independent variables**

- ✓ Sociodemographic profiles: age, gender, address/region, educational and marital status; smoking habit; history of appendectomy or other intra-abdominal surgery; family history of IBD
- ✓ Variables for clinical profiles included:
  - Patients' symptoms
  - Age when symptoms started
  - Interval between onset and diagnosis
  - Initial behavior of CD (inflammatory, structuring or penetrating)
  - Colonoscopic findings
  - Disease location/extent and behavior using the Montreal classification
  - Histologic findings
  - Complications of IBD-CD (abscess, fistula, and fissure)
  - Location and extent of UC (distal, left colitis, pancolitis)
  - EIMs manifestations - evidence of past or present documentation of peripheral arthritis (i.e., arthralgia with swelling, redness, warmth, or limitation of movement),
- ✓ Therapeutic characteristics/intervention (Medication used for treatment)
  - Current and past IBD treatment
  - Drug therapy at diagnosis
  - Surgical intervention (colectomy, others)
  - Disease activity and disease course at inclusion

## **4.7. Operational Definitions**

**Diagnosis of inflammatory bowel disease:** For this study, IBD diagnosis will be considered when the diagnosis of CD and UC is made by a gastroenterologist based on the following criteria:

**CD:** diagnosed when endoscopy done by a senior gastroenterologist reveals suggestive endoscopic features (like skip lesions, mucosal ulcerations, cobblestone appearance, aphthous ulcers,) with supportive histologic findings (including deep inflammation or chronic terminal ileal inflammation) in a patient with typical clinical symptoms.

**UC:** diagnosed when endoscopy done by a senior gastroenterologist reveals suggestive endoscopic features (like a diffuse mucosal disease of colon with different proximal extensions from the rectum, superficial inflammation, and rectal involvement without any evidence of small bowel involvement other than backwash ileitis) with supportive histologic findings (vascular congestion, crypt abscesses, cryptitis, and crypt branching) in a patient with typical clinical symptoms.

**EIM:** Extra intestinal manifestations of IBD include musculoskeletal, mucocutaneous, hepatic, ophthalmic, and urinary tract involvements.

## **4.8. Data collection procedures**

### **4.8.1. Data collection instruments**

A total of 148 case files with diagnosed or confirmed IBD was reviewed (all patients on follow up, including newly diagnosed cases during the study period). Data was collected from the medical records (charts and iCare registry) and from questionnaires filled out during medical follow-ups. Due to the current pandemic, the vast majority of patients were interviewed through phone after getting consent and detailed explanation of the study was given. A database of medical chart records was searched from January - August 2020.

#### **4.8.2. Data analysis and presentation**

Collected data was verified, cleaned and checked for quality before the analysis. The IBM SPSS Statistics software package version 26 was used for entry of statistical data and analysis. Descriptive statistics was used as a statistical data analysis method and was expressed as frequencies and numbers (percentages %). The results were summarized by using tables, and figures. Continuous variables were represented as means, standard deviations and minimum and maximum values, and categorical variables as frequencies. A P-value < 0.05 was considered to indicate statistical significance. Quantitative characteristics were compared using independent T test. Categorical information was compared between the two groups using the chi-square test. All the study variables were compared between the two categories of IBD, namely, UC and CD.

#### **4.9. Ethical consideration**

The ethical approval of the present investigation was obtained from the department of internal medicine. The consent was obtained from all patients before study participation. The participation was completely optional.

#### **4.10. Dissemination of the results**

The results of the study will be presented to the department of Internal Medicine, college of health sciences and will also be presented to those who need the result. The manuscript will also be sent to the EGA for reputable journal publication.

## 5. RESULTS AND DISCUSSION

### 5.1. Results

#### Sociodemographic profiles

A total of 102 patients with established IBD were included in the present study. There were 73 patients with CD (71.5%) and 29 patients with UC (28.5%). The demographic and clinical characteristics of all patients are shown in Tables 1 and 2. The mean age at diagnosis of all patients was  $28.3 \pm 10.6$  years (range: 18–70 years). The mean age at diagnosis of patients with CD was lower than that of patients with UC, and there was a statistical significance between these 2 groups (CD: 26.4 years vs. UC: 33 years,  $p = 0.04$ ) (CD=  $26.4 \pm 9.8$  years and UC=  $33 \pm 11.2$  years). Similarly, diagnosis during adolescence was significant for CD ( $p=0.003$ )

With respect to the sex distribution, female patients accounted for the majority (56.9%) (F: M ratio=1.3:1). The female-to-male ratio was 1.2: 1 in the CD group and 1.6: 1 in the UC group. The proportion of female patients showed no significant difference between the CD and UC groups (CD: 55% vs. UC: 62%,  $p = 0.654$ ).

A history of appendectomy (2.7% vs 3.4%) and other intra-abdominal surgery (8.2% vs 6.9%) was comparable in CD and UC, respectively; and a history of hemorrhoids was equally common in CD and UC (13.7% vs 13.8%). In the investigation of family history of IBD in all patients, there were only 5.9 % with a family history, but significant difference between the CD and UC groups (CD: 8.6% vs. UC: 0%,  $p = 0.01$ ). Smoking (active, ever smokers) was found to be associated with neither of the IBD subtypes. With regard to prior treatment with antitubercular drugs, a higher number of patients with CD (22/73; 30.1 %) had received such treatment, compared with 5 of 29 (17.2 %) with UC ( $p=0.03$ ).

The median (range) duration of illness in patients with CD (3.5 [1-12] years) was comparable with UC (4 [0.5-17] years) ( $p=0.3$ ). There was no difference in the median (range) time interval from onset of symptoms to the first diagnosis in patients with UC (22[1-84] months) and CD (17 [1-72] months) ( $p=0.4$ ).

### **Clinical manifestations**

In a comparison between the clinical characteristics and presentation of CD and UC (Table 3), Chronic non-bloody diarrhea ( $p= 0.001$ ), perianal symptoms ( $p= 0.03$ ) and UGI symptoms ( $p= 0.03$ ) were significantly more common in patients with CD. On the other hand, bloody diarrhea ( $p< 0.001$ ) and rectal bleeding ( $p< 0.001$ ) were significantly more common in UC compared to CD.

Abdominal pain (72% in UC; 82% in CD,  $p=0.0$ ) and weight loss (52% in UC; 57.5% in CD,  $p=0.5$ ) occurred in a comparable frequency. In the analysis of EIMs, the incidence of EIM was 16.7% in all patients with IBD. There was no significant difference in the incidence of EIM between the CD and UC groups (CD: 12.3% vs. UC: 24.1%,  $p= 0.2$ ). In both UC and CD patients, articular symptoms were seen in all but one patient.

### **Disease phenotype**

Among 29 patients with UC (where report on extent of the disease was available), the disease extent reported most commonly was left sided colitis ( $n=20$ , 69%), followed by proctitis ( $n=4$ , 13.8%), while pancolitis was least common ( $n=2$ , 6.9%). Among 73 patients with CD (where report on extent of the disease was available), the most common pattern of disease was involvement of both small and large intestine ( $n=28$ , 38.4%) followed by isolated small intestinal involvement ( $n=21$ , 28.8%) and isolated colonic involvement ( $n=13$ , 17.8%). There was no report of involvement of the upper GI tract (L4). Approximately 15% of CD and 10% of UC patients had no documented data regarding disease location. Eleven patients (15.1%) had perianal involvement and 9(12.3%) were complicated with fistula formation.

Concerning the disease behavior of CD, B1 (nonstricturing and nonpenetrating type), B2 (stricturing type), and B3 (penetrating type) were observed in 49.3%, 23.3% and 16.4% of patients, respectively. 1.4% of patients were reported to have perianal disease (B1p) as a disease modifier. The Montreal classifications of all patients with IBD in this study are summarized in Table 4. Ileocolonic involvement and inflammatory type accounted for the majority of our CD cases. In the disease extension of UC, it showed that the incidence of E1, E2, and E3 at diagnosis was 13.9%, 68.9%, and 6.9%, respectively.

### **Course of disease**

The course of both diseases was characterized by frequent relapse in many patients. The proportion of patients with intermittent flares and chronic continuous disease was comparable between the 2 IBD subtypes (Table 7). More than 60% of patients with both diseases remained on indefinite medical treatment ( $p=0.5$ ). Discontinuation of medical treatment was slightly more common in UC (27.6%) compared to CD (13.7%) ( $p=0.45$ ). Only 10.3% of patients with UC had undergone colectomy while 19.1% of patients with CD underwent surgical intervention ( $p=0.003$ ). The majority of patients were in remission, 72.2% for UC patients and 82% for CD patients ( $p=0.3$ ).

### **Treatment received**

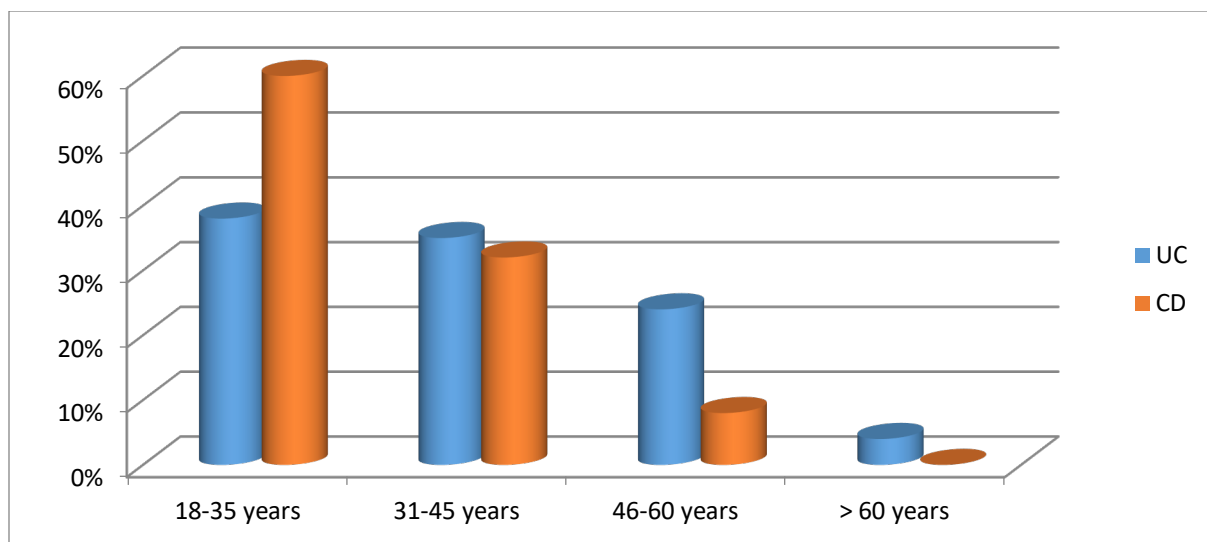
Different forms of disease-specific treatment received by patients were mentioned and/or documented; these are summarized in Tables 5 and 7. Approximately 86% of patients with UC and 70% of CD had received corticosteroids monotherapy at the time of initial diagnosis; 31% and 19% of them were taking corticosteroids at the time of inclusion in the study. More patients with CD (80% vs 55%) had received azathioprine; other immunosuppressants such as methotrexate or 6-MP were used in only a minority of patients. While only 13.7% ( $n=14$ ) of patients used 5-aminosalicylic acids (5-ASAs) in the course of their illness, none of the patients has ever used a biologic or any kind of local therapy.

There was a statistical difference in treatment between the UC and CD groups for 5-ASA (UC: 31% vs. CD: 6.8%,  $p = 0.001$ ), and corticosteroids (CD: 80.0% vs. UC: 100%,  $p = 0.008$ ). However, immunomodulator use was shown to be comparable between the two groups (CD: 89% vs. UC: 72.4%,  $p=0.07$ ). In this study, the surgical intervention rate in all patients with IBD was 33.3%, with rate of bowel resection/colectomy being 18.6% among others. Patients with CD showed a significantly higher bowel resection rate than those with UC (CD: 21.9% vs. UC: 10.3%,  $p= 0.003$ )

**Table 1. Demographic and Socioeconomic Characteristics of IBD Patients**

| Characteristics                           |                           | Type of IBD |            |                | P value     |
|-------------------------------------------|---------------------------|-------------|------------|----------------|-------------|
|                                           |                           | UC<br>N=29  | CD<br>N=73 | Total<br>N=102 |             |
| Age category, n (%)                       | 18-35years                | 11 (37.9)   | 44 (60.3)  | 55 (53.9)      | <b>0.04</b> |
|                                           | 31-45 years               | 10 (34.5)   | 23 (31.5)  | 33 (32.3)      | 0.50        |
|                                           | 46-60 years               | 7 (24.1)    | 6 (8.2)    | 13 (12.8)      | 0.50        |
|                                           | > 60 years                | 1 (3.5)     | 0          | 1(1.0)         |             |
| Gender, n (%)                             | Male                      | 11 (25)     | 33 (75)    | 44 (43)        |             |
|                                           | Female                    | 18 (31)     | 40 (69)    | 58 (57)        | 0.60        |
| Address, n (%)                            | Addis Ababa               | 71(69.6)    |            |                |             |
|                                           | Out of Addis Ababa        | 31(30.4)    |            |                |             |
| Marital status, n (%)                     | Single                    | 52 (51)     |            |                | 0.30        |
|                                           | Married                   | 50 (49)     |            |                |             |
| Occupation, n (%)                         | Employed                  | 25 (24.5)   |            |                | 0.20        |
|                                           | Merchant                  | 6 (5.9)     |            |                |             |
|                                           | Housewife                 | 25 (24.5)   |            |                |             |
|                                           | Farmer                    | 1 (1.0)     |            |                |             |
|                                           | None/currently unemployed | 20 (19.6)   |            |                |             |
|                                           | Student                   | 18 (17.6)   |            |                |             |
|                                           | Others                    | 7 (6.9)     |            |                |             |
| Educational status, n (%)                 | Can't read and write      | 3 (2.9)     |            |                | 0.001       |
|                                           | Can read and write        | 8 (7.8)     |            |                |             |
|                                           | Primary (1-8)             | 23 (22.5)   |            |                |             |
|                                           | Secondary and above       | 68 (66.7)   |            |                |             |
| First degree relatives with definite IBD  |                           | 0           | 6 (8.2)    | 6 (5.9)        | <b>0.01</b> |
| Smoking status, n (%)                     | Former                    | 0           | 1 (1)      | 1              | 0.50        |
|                                           | Never                     | 0           | 0          | 0              |             |
| Hx of hemorrhoid, n (%)                   |                           | 4 (13.8)    | 10 (13.7)  | 14 (13.7)      | 0.90        |
| Appendectomy Hx, n (%)                    |                           | 1(3.4)      | 2 (2.7)    | 3 (2.9)        | 0.80        |
| Other intra-abdominal surgeries*, n (%)   |                           | 2 (6.9)     | 6 (8.2)    | 8 (7.8)        | 0.80        |
| Prior ATT for ITB before diagnosis, n (%) |                           | 5 (17.2)    | 22 (30.1)  | 27 (26.5)      | <b>0.03</b> |
| OCP use among married females             |                           | 3 (16.7)    | 7 (17.5)   | 10 (21.3)      | 0.60        |

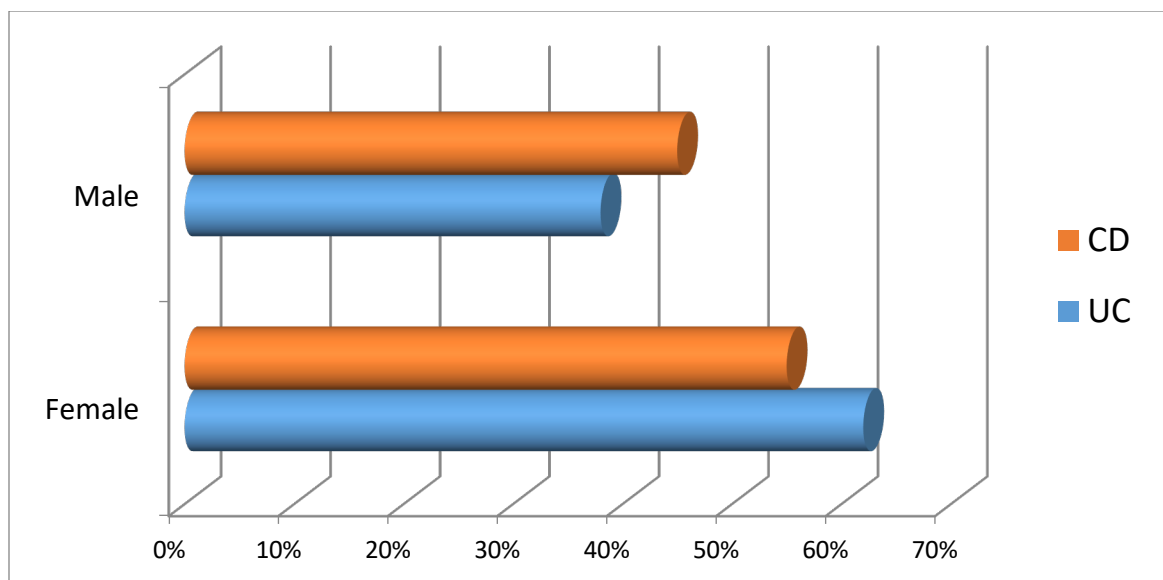
\*gastrojejunostomy, cholecystectomy, unspecified



**Figure 1.** Age group distribution

**Table 2.** Clinical Characteristics of IBD Patients 1

| Characteristics                                                 |                              | Type of IBD |            |                | P value |
|-----------------------------------------------------------------|------------------------------|-------------|------------|----------------|---------|
|                                                                 |                              | UC<br>N=29  | CD<br>N=73 | Total<br>N=102 |         |
| Age of diagnosis (years), n (%)                                 | Adolescence (< 19)           | 0           | 10 (13.7)  | 10 (9.8)       | 0.003   |
|                                                                 | Young Adults (19–35)         | 20 (69)     | 57 (78)    | 77 (75.5)      | 0.02    |
|                                                                 | Middle –Aged Adults (36–55)  | 9 (31)      | 6 (8.3)    | 15 (14.7)      | 0.02    |
|                                                                 | Older Adults (> 55)          | 0           | 0          | 0              |         |
| Mean age at diagnosis (years) (±SD)                             |                              | 33 ± 11.2   | 26.4 ± 9.8 | 28.3 ± 10.6    | 0.04    |
| Duration of disease (Years), n (%)                              | Short (< 5 years)            | 21(72.4)    | 60(82.1)   | 81(79.4)       | 0.33    |
|                                                                 | Long (5-10 years)            | 7(24.1)     | 10(13.6)   | 17(16.7)       |         |
|                                                                 | (> 10 years)                 | 1(3.4)      | 3(4.1)     | 4(3.9)         |         |
| Interval between symptom onset and diagnosis (in months), n (%) | 1-5 months                   | 7(24.1)     | 11(15)     | 18(17.6)       | 0.400   |
|                                                                 | 6-10 months                  | 4(13.7)     | 13(17.8)   | 17(16.7)       |         |
|                                                                 | 11-15 months                 | 1(3.4)      | 12(16.3)   | 13(12.7)       |         |
|                                                                 | > 20 months                  | 5(17.2)     | 12(16.3)   | 17(16.7)       |         |
|                                                                 | Couldn't inform/be retrieved | 12(41.3)    | 25(34.2)   | 37(36.2)       |         |



**Figure 2.** Gender distribution and type of IBD

**Table 3.** Clinical Characteristics of IBD Patients 2- Presenting complaints.

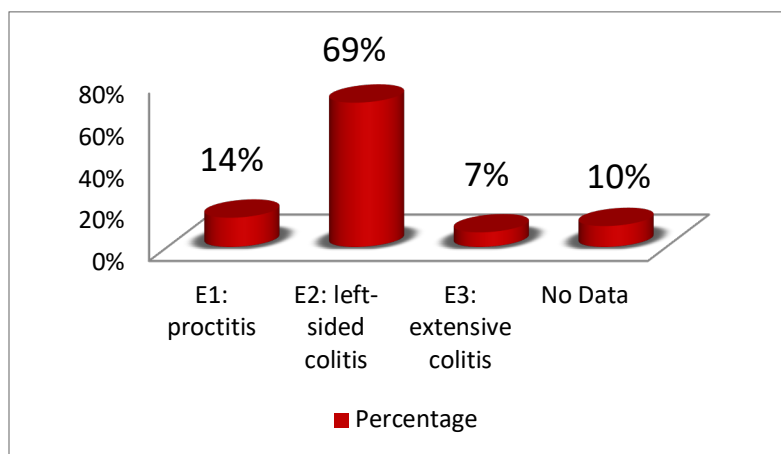
| Characteristics                                  |                            | Type of IBD                          |            |                | <i>P</i> value   |
|--------------------------------------------------|----------------------------|--------------------------------------|------------|----------------|------------------|
|                                                  |                            | UC<br>N=29                           | CD<br>N=73 | Total<br>N=102 |                  |
| Abdominal Pain, n (%)                            |                            | 21(72.4)                             | 60(82.1)   | 81(79.4)       | 0.3              |
| Chronic diarrhea without blood, n (%)            |                            | 6(20.6)                              | 46(63)     | 52(50.9)       | <b>0.001</b>     |
| Bloody diarrhea/exclusive rectal bleeding, n (%) |                            | 23(79.3)                             | 8(10.9)    | 31(30.3)       | <b>&lt;0.001</b> |
| Mucoid stool, n (%)                              |                            | 7(24.1)                              | 13(17.8)   | 20(19.6)       | 0.4              |
| Weight loss, n (%)                               |                            | 15(51.7)                             | 42(57.5)   | 57(55.8)       | 0.5              |
| UGI symptoms*, n (%)                             |                            | 2(6.8)                               | 21(28.7)   | 23(22.5)       | <b>0.03</b>      |
| Peri anal symptoms, n (%)                        | Draining Fistula           | 0                                    | 9 (12.3)   | NA             | <b>0.03</b>      |
|                                                  | Anorectal pain             | 1(3.4)                               | 1(1.3)     | 2(1.9)         |                  |
|                                                  | Fecal urgency/incontinence | 1(3.4)                               | 1(1.3)     | 2(1.9)         |                  |
| Perianal disease in CD, n (%)                    |                            | NA                                   | 11 (15.1)  | NA             | <b>0.001</b>     |
| Other symptoms**, n (%)                          |                            |                                      |            |                | 0.5              |
| EIM, n (%)                                       | Total                      | 8(27.5)                              | 9(12.3)    | 17(16.6)       | 0.2              |
|                                                  | Type of EIM                | Joint (16), 1 (pyoderma gangrenosum) |            |                |                  |
| CT of the abdomen done for suspected CD, n (%)   | Consistent with CD         | NA                                   | 28(38.5)   | NA             |                  |
|                                                  | Not consistent with CD     | NA                                   | 1(1.3)     | NA             |                  |
|                                                  | Normal                     | NA                                   | 1(1.3)     | NA             |                  |

\*- vomiting, bloating, epigastric pain, \*\* tenesmus, alternating D and C, constipation, fever, anorexia  
NA- not applicable

**Table 4:** Montreal classification of patients with inflammatory bowel disease.

|                                  |                                      | Type of IBD |            |
|----------------------------------|--------------------------------------|-------------|------------|
|                                  |                                      | UC<br>N=29  | CD<br>N=73 |
| UC disease extent<br>, n (%)     | E1: proctitis, <i>n (%)</i>          | 4(14)       | NA         |
|                                  | E2: left-sided colitis, <i>n (%)</i> | 20(69)      | NA         |
|                                  | E3: extensive colitis, <i>n (%)</i>  | 2(7)        | NA         |
|                                  | No Data, <i>n (%)</i>                | 3(10)       | NA         |
| CD disease<br>phenotype, n (%)   | L1: ileum, n (%)                     | NA          | 21(29)     |
|                                  | L2: colon, n (%)                     | NA          | 13(18)     |
|                                  | L3: ileo-colon, n (%)                | NA          | 28(38)     |
|                                  | L4: UGI tract, n (%)                 | NA          | 0          |
|                                  | No Data                              | NA          | 11(15)     |
| CD disease<br>behavior, n (%)    | B1: Inflammatory*                    | NA          | 36 (49.3)  |
|                                  | B2: Stricturing                      | NA          | 17 (23.3)  |
|                                  | B3: penetrating                      | NA          | 12 (16.4)  |
|                                  | B1p: perianal                        | NA          | 1(1.4)     |
|                                  | Unspecified/missing                  | NA          | 7 (9.6)    |
| Histological<br>Diagnosis, n (%) | Ulcerative Colitis                   | 23 ()       | NA         |
|                                  | Crohns colitis                       | NA          | 45         |
|                                  | Non-specific Chronic Colitis         | 4           | 20         |
|                                  | Unspecified/data lacking             | 2           | 8          |

\*-nonstricturing, nonpenetrating; NA- not applicable



**Figure 3.** UC disease phenotype by Montreal classification

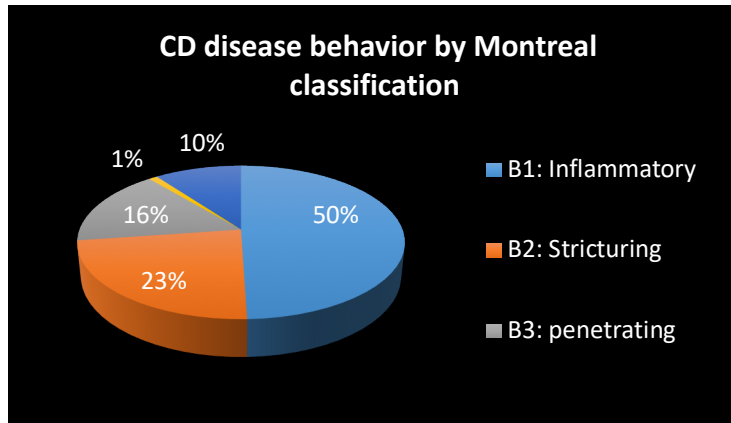


Figure 4A. CD disease behavior by Montreal classification

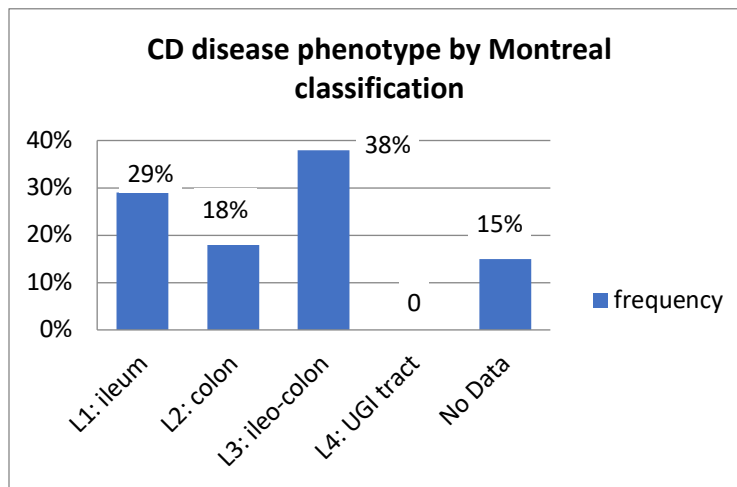


Figure 4B. CD disease phenotype by Montreal classification

**Table 5:** Initial therapy at diagnosis of patients with inflammatory bowel disease.

| Treatment regimen                        | Type of IBD |            |                |
|------------------------------------------|-------------|------------|----------------|
|                                          | UC<br>N=29  | CD<br>N=73 | Total<br>N=102 |
| Steroid monotherapy, n (%)               | 25 (86.2)   | 48 (65.8)  | 73 (71.6)      |
| Immunomodulators*, n (%)                 | 0           | 1 (1.4)    | 1 (1)          |
| 5-ASA, n (%)                             | 0           | 2 (2.7)    | 2 (1.9)        |
| Steroid with immunomodulators, n (%)     | 4 (13.8)    | 7 (9.6)    | 11 (10.8)      |
| Initial diagnosis after surgery**, n (%) | 0           | 15 (20.5)  | 15 (14.7)      |
|                                          |             |            |                |

\* AZA, MTX, 6-MP    \*\* postoperative biopsy sample revealing a suggestive histological diagnosis

**Table 6:** Treatment course of patients with inflammatory bowel disease

|                                                                 |                             | Type of IBD |            |                | P value |
|-----------------------------------------------------------------|-----------------------------|-------------|------------|----------------|---------|
|                                                                 |                             | UC<br>N=29  | CD<br>N=73 | Total<br>N=102 |         |
| Clinical response to initial therapy, n (%)                     | Yes                         | 27 (93.1)   | 70 (95.9)  | 97 (95.1)      | 0.4     |
|                                                                 | No                          | 1 (3.4)     | 3 (4.1)    | 4 (3.9)        |         |
|                                                                 | No Data                     | 1 (3.4)     | 0 (0)      | 1 (1)          |         |
| Steroid dependency, n (%)                                       | Yes                         | 4 (13.8)    | 4 (5.5)    | 8 (7.8)        | 0.3     |
|                                                                 | No                          | 25 (86.2)   | 54 (73.9)  | 79 (77.5)      |         |
| Maintenance therapy during the study period, n (%)              | Steroids alone              | 4 (13.8)    | 4 (5.5)    | 8 (7.8)        | 0.09    |
|                                                                 | Immunomodulators            | 11 (37.9)   | 50 (68.5)  | 61 (59.8)      |         |
|                                                                 | Steroid and Immunomodulator | 5 (17.2)    | 10 (13.7)  | 15 (14.7)      |         |
|                                                                 | 5-ASA                       | 3 (10.4)    | 0          | 3 (4.9)        |         |
|                                                                 | None                        | 6 (20.7)    | 9 (12.0)   | 15 (14.7)      |         |
| Clinical disease activity during last visit/study period, n (%) | In clinical remission       | 21 (72.4)   | 60 (82.2)  | 81 (79.4)      | 0.3     |
|                                                                 | Not in clinical remission   | 8 (27.6)    | 13 (17.8)  | 21 (20.6)      |         |

**Table 7:** The most common drug treatments taken by IBD patients during the course of their illness

| Treatment regimen                                    | Type of IBD |            |                | <i>P</i> value |
|------------------------------------------------------|-------------|------------|----------------|----------------|
|                                                      | UC<br>N=29  | CD<br>N=73 | Total<br>N=102 |                |
| Systemic Corticosteroids (oral), n (%)               | 29 (100)    | 58 (79.4)  |                | <b>0.008</b>   |
| Immunomodulators,* (%)                               | 21 (72.4)   | 65 (89)    | 86 (84.3)      | 0.07           |
| 5-ASA, n (%)                                         | 9 (31)      | 5 (6.8)    | 14 (13.7)      | <b>0.001</b>   |
| Antibiotics (Combination of Cipro and/or MDZ), n (%) | 1 (3.4)     | 14 (19.1)  | 15 (14.7)      | <b>0.008</b>   |
| Combination of drugs (two or more), n (%)            | 24 (82.7)   | 54 (73.9)  | 78 (76.5)      | 0.35           |
| Biologics, n (%)                                     | 0           | 0          | 0              |                |
| Local treatment, n (%)                               | 0           | 0          | 0              |                |

\* 78 patients received AZA, 3 pts received MTX, 5 pts both AZA & MTX, only 1 pt received 6MP

**Table 8:** Outcome of treatment and follow up

|                                                |                                   | Type of IBD |            |                | <i>P</i> value |
|------------------------------------------------|-----------------------------------|-------------|------------|----------------|----------------|
|                                                |                                   | UC<br>N=29  | CD<br>N=73 | Total<br>N=102 |                |
| Discontinued Rx and/or follow up, n (%)        |                                   | 8 (27.6)    | 10 (13.7)  | 18 (17.6)      | 0.45           |
| Indefinite medical therapy, n (%)              |                                   | 18 (62.1)   | 46 (63.1)  | 65 (63.7)      |                |
| Bowel resection/Colectomy*, n (%)              |                                   | 3 (10.3)    | 16(21.9)   | 19 (18.6)      | <b>0.003</b>   |
| Recurrence after surgery, n (%)                |                                   | NA          | 3 (4.1)    | 3 (2.6)        |                |
| Disease course at the time of inclusion, n (%) | Infrequent relapse/single episode | 8 (27.6%)   | 21 (28.8)  | 29 (28.4)      | 0.5            |
|                                                | Frequent relapse                  | 16 (55.2)   | 44 (60.3)  | 60 (58.8)      |                |
|                                                | Chronic continuous                | 3 (10.3)    | 7 (9.6)    | 10 (9.8)       |                |
|                                                | Data lacking                      | 2 (6.9)     | 1 (1.3)    | 3 (2.9)        |                |

\*info regarding extent of colectomy couldn't be retrieved or found; NA- not applicable

Table 9: Common Challenges faced and encountered side effects

| Variable                                   |                                    | Frequency<br>No of patients | Percent<br>% |
|--------------------------------------------|------------------------------------|-----------------------------|--------------|
| Challenges faced                           | Availability of drugs              | 3                           | 2.9          |
|                                            | Cost & Availability of drugs       | 51                          | 50           |
|                                            | Side effect only                   | 3                           | 2.9          |
|                                            | Cost, Availability and Side effect | 29                          | 28.4         |
|                                            | None                               | 16                          | 15.7         |
| Common encountered side effects of drug Rx | Cushingoid                         | 10                          | 9.8          |
|                                            | Other steroid induced*             | 12                          | 11.8         |
|                                            | Cushingoid & other Steroid induced | 11                          | 10.8         |
|                                            | Cytopenia from IMD                 | 4                           | 3.9          |
|                                            | Hepatotoxicity from AZA            | 2                           | 2.0          |
|                                            | Cushingoid and cytopenia           | 4                           | 3.9          |
|                                            | Others**                           |                             |              |

\*osteoporosis, alopecia, gastritis, HTN (new), hyperglycemia; \*\*5-ASA toxicity (polyarthralgia & generalized pruritus)

Table 10: Surgical treatment

| Variable                                               |                             | Type of IBD |             |                | P value      |
|--------------------------------------------------------|-----------------------------|-------------|-------------|----------------|--------------|
|                                                        |                             | UC<br>N=29  | CD<br>N=73  | Total<br>N=102 |              |
| Surgery for IBD at any point (Need for surgery), n (%) |                             | 4(13.7)     | 30 (41)     | 34(33.3)       | <b>0.003</b> |
| Surgical indication, n (%)                             | Stricture/obstruction       | 1(3.4)      | 14(46.7)    | 15(44.1)       |              |
|                                                        | Fistulizing disease         | NA          | 7(23.3)     | NA             |              |
|                                                        | Abscess                     | 0           | 2(6.7)      | 2(5.9)         |              |
|                                                        | Intestinal perforation      | 0           | 2(6.7)      | 2(5.9)         |              |
|                                                        | Unknown/no data/unspecified | 3(75)       | 5(16.7)     | 8(23.5)        |              |
| Type of surgery, n (%)                                 | Colectomy (RAA)             | 3(75)       | 16 (53.3) * | 19(55.9)       | <b>0.003</b> |
|                                                        | Diversion                   | NA          | 6(20)       | 6(17.6)        |              |
|                                                        | Abscess drainage            | NA          | 2(6.7)      | 2(5.9)         |              |
|                                                        | Fistulotomy/-ectomy         | NA          | 1(3.3)      | 1(2.9)         |              |
|                                                        | No data                     | 1(25)       | 5(16.7)     | 6(17.6)        |              |
| Improvement after surgery, n (%)                       | Yes                         | 4(100)      | 27(90)      | 31(30.3)       | 0.5          |
|                                                        | No                          | 0           | 2(6.7)      | 2(1.9)         |              |
|                                                        | Unspecified/no data         | 0           | 1(3.3)      | 1(0.9)         |              |
| Post op chemo, n (%)                                   | Yes                         | NA          | 16(53.3)    | NA             |              |
|                                                        | No                          | NA          | 14(46.7)    | NA             |              |
| Number of surgeries per patient, n (%)                 | One, n (%)                  | 4 (100)     | 22 (73.3)   | 26 (76.5)      |              |
|                                                        | Two, n (%)                  | 0           | 6 (20)      | 6 (17.7)       |              |
|                                                        | Three, n (%)                | 0           | 2 (6.7)     | 2 (5.8)        |              |

\*Includes: Resection of terminal ileal (RAA) (1 pt); NA- not applicable

## 5.2. Discussion

Ulcerative colitis and CD are chronic inflammatory bowel diseases of which the pathogenesis and pathologic state yet remain to be clearly defined. Traditionally IBD is thought to be uncommon in developing nations, including sub-Saharan African countries. And the extent of disease burden is largely unknown because of inadequate epidemiological data. According to a four-decade analysis from a single tertiary center in Malaysia, the burden of UC is twice that of CD in developing as compared to the West (Kedia & Ahuja, 2017; Mansour-Ghanaei et al., 2015).

The ratio of CD to UC in this study was 2.5:1, denoting an increased prevalence of CD, which contrasts the study results from west Africa and Asian countries (where majority of patients had UC (Devlen et al., 2014; Kedia & Ahuja, 2017; Mansour-Ghanaei et al., 2015). A ratio of 6:1 for UC to CD in Egyptian series was observed (Esmat, El Nady, Elfekki, Elsherif, & Naga, 2014).

The female to male ratio was 1.6:1 for UC, comparable to the ones done in north and west African countries (with a slight increase of the female prevalence), denoting an increased number of affected females studies (Archampong & Nkrumah, 2013; Esmat, El Nady, et al., 2014). Similarly, female preponderance was observed in CD with 1.2:1 ratio related to retrospective analysis of IBD registry data from a teaching hospital in Accra (Nkrumah et al., 2008). However, studies from other African and Asian countries showed a male predominance in CD (Archampong & Nkrumah, 2013).

IBD in the West is characteristically associated with a bimodal age distribution pattern, with a peak at age 20-39 years and a second smaller peak at 60-79 years. In contrary to reports from Asian countries, diagnosis of IBD at an early age is seen in African countries (Esmat, El Nady, Elfekki, Elsherif, & Naga, 2014). Similarly, the mean age of patients with UC in this study was significantly higher than that of those with CD. The mean age at diagnosis for CD and UC was 26.4 years and 33 years respectively. Our patients were diagnosed at a younger age for both CD and UC compared with patients from Egyptian and Ghanaian studies (Archampong & Nkrumah, 2013; Esmat, El Nady, et al., 2014).

As compared to people who never or rarely smoked, current smokers are thought to have a reduced risk whereas ex-smokers have a greater risk for development of UC; on the other hand, smoking aggravates the activity of CD (Esmat, El Nady, et al., 2014; Kedia & Ahuja, 2017). Interestingly this study did not find any association between smoking and either UC or CD. This might probably be due to the overall low prevalence rate of smoking in our country, estimated to be < 3% or the relatively small sample size of the study. Similarly, no association was observed between appendectomy and the specific IBD subtypes.

Epidemiologic studies on familial prevalence of IBD in developed countries have shown strong and significant associations (Orholm, Fonager, & Sørensen, 1999). In the present study, a history of definite IBD in one family member was present in only 8.6% of patients with CD which is lower than that reported from the Western nations. It is generally thought that a family history of UC increases an individual's risk of developing UC (Childers et al., 2014). This study failed to find this, as a family history was reported in none of the patients. This may show a truly low familial aggregate; or it might have resulted from under diagnosis due to a low disease awareness; to the confusion of IBD with the causes of infectious diarrhea, which is common in our country; and to limited access to diagnostic tools. In addition, data on prior treatment with antitubercular drugs were available in 27 (26.5%) patients, which may signify overlap of symptoms between IBD, CD in particular, and intestinal TB. Thus, in an environment endemic for tuberculosis, like ours, differentiating between Crohn's and tuberculous enteritis can be tasking.

The majority of patients presented had a 1 to 2 years of symptoms before diagnosis, a problem common to other cases reported from sub-Saharan Africa countries (Ukwenya, Ahmed, Odigie, & Mohammed, 2011). It is a rampant practice for our patients to seek varieties of complementary and alternative medical practitioners for any chronic illness and come to the hospital only as the last option. Delay or failure of diagnosis may also result from lack of awareness and denial of the presence of IBD by many physicians. A patient presenting with chronic diarrhea, abdominal pain, and weight loss which are the hallmarks of uncomplicated IBD will be most likely investigated and managed for parasitic infestations or bacterial infections (Marteau, 1999).

It appears that the clinical characteristics of IBD may be different from those of Western countries, however, the present study revealed that the demographic pattern and clinical picture of IBD are more or less the same as that of other developing countries (Makharia et al., 2012). The clinical manifestations of UC are similar in different parts of the world, particularly between Asian and sub Saharan African countries (Wang, Zhang, & Ouyang, 2007). Similarly, the clinical manifestations of CD in our patients are similar to that of other developing countries. Rectal bleeding is a very common symptom, appearing in 30% of patients with CD in developed countries (Wang et al., 2007). However, the present study found that it was only 11% in our patients.

The extent of UC in this study was proctitis in 14%, left-sided colitis in 69%, and pancolitis in 7% which is in contrary to reports from India and other Asian countries, where pancolitis accounted for majority of cases (Ling et al., 2002; Makharia et al., 2012). Ileo-colonic disease was seen in 38% of patients with CD, while 18% and 29% had isolated colonic and small intestinal involvement, respectively. In the study of patients with CD from India, the location of disease was colon 41%, terminal ileum 32%, and ileo-colon 23%; the upper GI tract was involved in 4% (Das et al., 2009). In another report of 200 patients with Crohn's disease from the same country, involvement was ileo-colonic in 40%, colonic in 26%, ileal in 26%, and upper GI in 8% (Ahuja & Tandon, 2010b). Approximately 23% of our patients had stricturing disease; and penetrating disease was reported in 16.4% of patients. Studies from India reported a higher prevalence of both stricturing and fistulizing disease (Ahuja & Tandon, 2010b; Das et al., 2009).

One or more extra-intestinal symptom(s) were reported in more than half of patients from a large Indian study; the most common were arthralgia (with or without evidence of arthritis) and backache (Makharia et al., 2012). However, the prevalence of EIMs in our patients was much lower, which was seen in only 16.6%, and are found almost equally in UC and CD. Upper GI tract involvement in CD and EIMs, other than articular symptoms were almost not seen in our patients, which contrast the findings from the aforementioned Indian study.

A Japanese hospital-based cohort reported a relapsing-remitting pattern in 61%, chronic-continuous course in 23% and a single attack in only 16 percent (Fujimoto et al., 2007). Approximately a third of our patients with IBD had infrequent relapses, while 10% had chronic active course and 60% had frequent remissions and relapses. In the present study, 17.6% of patients had discontinued their medications; the factors that led to this decision and the outcome of this were not evaluated.

With respect to initial therapy received at initial diagnosis, virtually all patients with the diagnosis of UC had received corticosteroids. However, approximately 80% of patients at initial diagnosis of CD received steroids, this likely was due to the 20% proportion of patients diagnosed after surgery following which they're only started on chemotherapy without steroids.

The use of 5-ASA was more common in UC than in CD, while the reverse was true for the use of azathioprine. Treatment of patients with IBD has profound challenges in our society. As to our knowledge, the basic drug for UC, sulphasalazine and biologics are almost not available, at least in governmental institutions. Access to immunomodulators (in terms of both availability and cost), albeit to a lesser extent, has also been a great difficulty for our patients. Ultimately all these will hamper the provision of an appropriate and guideline directed therapy.

The total bowel resection rate done for different indications in the present study was 18.6% which is far higher than the colectomy rate reported from one Egyptian study, which was 2.9% after 5-15 years (Esmat, El Nady, et al., 2014). However, in studies from Western countries, it ranged from 24% to 34% after 10 years (Magro et al., 2012). This data indicates that the behavior of IBD in our patients is milder than its behavior in Western countries, but worse than that seen in Egypt.

In a recent hospital-based study in central Taiwan, patients with CD showed a significantly higher bowel resection rate than those with UC (Chou et al., 2019). Similar finding was observed our study.

Documented reports of inflammatory bowel disease in the east African sub region are scanty, thus it is difficult to make any comparisons of the condition with our neighboring countries.

### **5.3. Conclusion**

In conclusion, the study did not find IBD in our patients to be a different disease entity, however, there are differences with respect to sociodemographic features, clinical characteristics and therapy. CD was more common than UC with a ratio of 2.5:1, and the mean age at diagnosis was in the mid-twenties for the former and early thirties for the later. Both of these disease entities were more common in females, albeit with a different magnitude. Most of our patients with IBD presented late after symptom onset, yet medically responsive. Left-side colitis in UC and ileo-colon involvement in CD are the predominant disease phenotypes. The major hindering factor in caring for these patients remains the availability of major drugs, biologics among others. No association with smoking was found and Bowel resection rate in CD was 19%

### **6. Recommendation**

- Since this was hospital-based study with a small sample size, a larger study recruiting more patients with a longer duration of follow-up at the national or hospital level are needed for:
  - Further identification of factors correlating with the severity and extent of IBD,
  - Better understanding IBD and
  - Assessment of treatment outcomes

### **7. Limitation of the study**

The importance of this present study is that it provides a reasonable picture of the demographic features and clinical manifestations of patients with IBD as well as the disease course and pattern of treatment given to them. We hope this small sampled study will encourage further study on this disease at both hospital and nationwide level. However, it is not without limitations. The major limitations of the present study are its small sample size and single centered clinic-based study; as such the results cannot be generalized to the general population since patients that present to this hospital may not represent patients in the country with a very diverse sociocultural background.

Hospital-based data may also lead to an overestimation of disease severity. Last but not least, as this study is based mostly on retrospective chart review, the data obtained may be incomplete for some patients and inconsistencies in follow up could be another shortcoming of the present study. The shortcomings of the study include incomplete data completion in some patients, and the fact that most patients were interviewed through phone; the lack of follow up is another shortcoming of the present study.

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## 9. ANNEXES

### **Annex I: Declaration**

I, the undersigned, declare that this postgraduate thesis is my original work, has not been presented for a degree in this or any other university and that all sources of material used for the thesis have been duly acknowledged.

Postgraduate Candidate: Neway Fekede (MD, Internal Medicine Resident)

Signature: .....

Date of Submission: January 8, 2021

This thesis has been submitted with my approval as advisor.

Advisor: Yohannes Berhanu (MD, Internist, Gastroenterologist)

Signature: .....

Date: .....

Place: Addis Ababa, Ethiopia

## Annex- II: Questionnaires in English Version

Questionnaire number

Data:

MRN/ iCare No: \_\_\_\_\_

| No                                         | Questions          | Responses                                                                                                              | Code |
|--------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------|------|
| <b>Part 1. Socio-demographic variables</b> |                    |                                                                                                                        |      |
| 101                                        | Age                | _____ Years                                                                                                            |      |
| 102                                        | Sex                | 1. Male    2. Female                                                                                                   |      |
| 103                                        | Address            | 1. Addis Ababa<br>2. Oromia<br>3. Amhara<br>4. SNNPR<br>5. Others [specify] _____                                      |      |
| 104                                        | Place of residency | 1. Urban<br>2. Rural                                                                                                   |      |
| 105                                        | Marital status     | 1. Single (never married)<br>2. Married<br>3. Separated (Divorced, Widowed)                                            |      |
| 106                                        | Occupation         | 1. Employed<br>2. Merchant<br>3. Farmer<br>4. Daily Laborer<br>5. Student<br>6. House wife<br>7. Other [specify] _____ |      |
| 107                                        | Educational Status | 1. Can't read and write<br>2. Can read and write<br>3. Primary [1-8]<br>4. Secondary and above                         |      |

|     |                               |                                                                                         |  |
|-----|-------------------------------|-----------------------------------------------------------------------------------------|--|
| 108 | Religion                      | 1. Orthodox<br>2. Muslim<br>3. Protestant<br>4. Catholic<br>5. Others [specify] -----   |  |
| 109 | Family history of IBD         | 1. Yes<br>2. No<br>If <b>Yes</b> , (Parent, siblings or offspring with Dx of IBD)-_____ |  |
| 110 | Smoking status                | 1. Never<br>2. Former<br>3. Current<br>4. Unknown                                       |  |
| 111 | Appendectomy                  | 1. Yes<br>2. NO                                                                         |  |
| 112 | History of Hemorrhoid         | 1. Yes<br>2. NO                                                                         |  |
| 113 | Other intra-abdominal surgery | 1. Yes<br>2. NO<br>If <b>Yes</b> , specify_____                                         |  |
| 114 | Previous Tb                   | 1. Yes<br>2. NO                                                                         |  |
| 115 | Use Of OCP                    | 1. Yes<br>2. NO                                                                         |  |

# ANNEX – III : Questionnaires in Amharic Version

| ኃ.ሰ | የሰላሳ         | SMe                                                                                                                             | ረፂ |
|-----|--------------|---------------------------------------------------------------------------------------------------------------------------------|----|
| 101 | ከፂፂ@         | ----- ሽፍ                                                                                                                        |    |
| 102 | ጸታ           | 1. ወንጅ<br>2. 2. ሴት                                                                                                              |    |
| 103 | ከፂፂ-ሻ        | 1. ከፂፂ ከበበ<br>2. ከፂፂ<br>3. ከፂፂ<br>4. ጸታ-በ<br>5. ሴት /ሸፂፂ/-----                                                                   |    |
| 104 | የመኖሪያ ቦታ/ከፂፂ | 1. ከተማ<br>2. ገጠር                                                                                                                |    |
| 105 | ፳፬ውኛው ሰላሳ    | 1. ፂፂ ሸፂፂ<br>2. ሸፂፂ “>ፂ” >wa ፳፬>•\<br>3. ሸፂፂ “>wa ፳፬ፂ” /፳፬ ሀፂፂ<br>፳፬}ፂ፬/                                                        |    |
| 106 | ሸፂፂ•ፍ        | 1. *ፂፂፂፂፂ ፂፂፂፂፂ<br>2. S<eK=U<br>3. “ፂፂፂፂፂ ፂፂፂፂፂ”<br>4. –a,eፂፂፂፂፂ ፂፂፂፂፂ<br>5. K?L /ሸፂፂፂፂ/-----                                   |    |
| 107 | ፳፬ሀሀፂ ሸፂፂ    | 1. ሸፂፂ}T[(ፂ)/T”ፂፂፂ “ ሸፂፂ<br>፳፬Tፂፂፂ/ፂፂፂ<br>2. ፂፂፂ— ሸፂፂ /1-8ፂፂፂ/<br>3. ፂፂፂ— ሸፂፂ /9-12 ፂፂፂ “<br>c}ፂፂፂፂ/<br>4. ፂፂፂፂፂፂ “ ፂፂፂፂፂ ፂፂፂፂፂ |    |
| 108 | ፳፬ሀፂ ሰላሳ     | 1. ሸፂፂፂፂ— /}ፂፂፂ/<br>2. ፂፂፂፂ<br>3. ፳፬ሀፂፂ ፂፂፂፂፂ<br>4. K?L/ሸፂፂፂፂ/-----                                                             |    |

|     |                      |                                                                   |  |
|-----|----------------------|-------------------------------------------------------------------|--|
|     |                      |                                                                   |  |
| 109 | በቤተሰብ ውስጥ ተመሳሳይ ህመም  | 1. አዎን አለ<br>2. የለም<br>ካለ፡ ማን? (እናት/አባት፣ እህት/ወንድም፣ ልጅ ) ÃÑKê----- |  |
| 110 | ሲጋራ የማጨስ ሁኔታ         | 1. አጭሼ አላውቅም<br>2. አጨስ ነበር/ድሮ<br>3. አሁን<br>4. አይታወቅም              |  |
| 111 | የትርፍ አንጀት ቀዶ ህክምና    | 1. አለ<br>2. የለም                                                   |  |
| 112 | ሌላ የሆድ እቃ ቀዶ ህክምና    | 1. አለ<br>2. የለም                                                   |  |
| 113 | የኪነታሮት በሽታ ታመው ያውቃሉ? | 1. ሳይ<br>2. አላውቅም                                                 |  |
| 114 | የአንጀት ቲቢ ታመው ያውቃሉ?   | 1. ሳይ<br>2. አላውቅም                                                 |  |
| 115 | የወሊድ መከላከያ እንክብል     | 1. እወስዳለው<br>2. አልወስድ                                             |  |

## ANNEX – IV: Checklist for chart review

| No                                               | Questions                                                                   | Responses                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Code |
|--------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <b>Part 2. Disease Characteristics variables</b> |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| 201                                              | Age when symptoms started                                                   | _____ Years                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| 202                                              | Total disease duration                                                      | _____ Years                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| 203                                              | Interval between onset and diagnosis                                        | _____ Years                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| 204                                              | Presenting/predominant complaint (s) at diagnosis (circle all that applies) | <ol style="list-style-type: none"> <li>1. Abdominal pain</li> <li>2. Chronic diarrhea without blood</li> <li>3. Bloody diarrhea</li> <li>4. Mucoid diarrhea</li> <li>5. Rectal bleeding, anorectal pain, fissure</li> <li>6. Constipation</li> <li>7. Fever</li> <li>8. Anorexia</li> <li>9. Weight loss</li> <li>10. Abdominal mass/swelling</li> <li>11. Others (Vomiting, fatigue, fecal incontinence, melena, alternating diarrhea and constipation)</li> </ol> <p>_____</p> |      |
| 205                                              | Stool appearance                                                            | <ol style="list-style-type: none"> <li>1. Bloody</li> <li>2. Non-bloody</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                               |      |
| 206                                              | Extra intestinal manifestations (all that applies)                          | <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol> <p>If <b>Yes</b> specify (eye, skin, musculoskeletal, liver and biliary tree, AS, PSC) _____</p>                                                                                                                                                                                                                                                                                                         |      |

|     |                                                                                                          |                                                                                                                                                                      |  |
|-----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 207 | Ever hospitalized                                                                                        | <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>                                                                                              |  |
| 208 | IBD Type                                                                                                 | <ol style="list-style-type: none"> <li>1. UC</li> <li>2. CD</li> </ol>                                                                                               |  |
| 209 | Disease activity during the study period or<br>Currently in Clinical Remission<br>(as Yes and NO answer) | <ol style="list-style-type: none"> <li>1. Remission</li> <li>2. Active</li> </ol>                                                                                    |  |
| 210 | UC disease location at diagnosis<br>(Montreal disease phenotype)                                         | <ol style="list-style-type: none"> <li>1. E1=proctitis</li> <li>2. E2= distal</li> <li>3. E3= Extensive</li> </ol>                                                   |  |
| 211 | CD localization (Montreal)                                                                               | <ol style="list-style-type: none"> <li>1. L1= terminal ileum</li> <li>2. L2= colon</li> <li>3. L3= ileocolon</li> <li>4. L4= UGI</li> </ol>                          |  |
| 212 | CD behavior (Montreal)                                                                                   | <ol style="list-style-type: none"> <li>1. B1- Inflammatory</li> <li>2. B2 -Stricturing</li> <li>3. B3 - Penetrating/fistulising</li> <li>4. P - Perianal?</li> </ol> |  |
| 213 | Histology                                                                                                | <ol style="list-style-type: none"> <li>1. UC</li> <li>2. Crohns colitis</li> <li>3. Non-specific colitis</li> <li>4. Unspecified</li> <li>5. Normal</li> </ol>       |  |
| 214 | Other procedure/imaging                                                                                  | <ol style="list-style-type: none"> <li>1. Barium meal follow-through</li> <li>2. CT scan</li> <li>3. UGI endoscopy</li> </ol>                                        |  |

| No                                                                      | Questions                                                                    | Responses                                                                                                         | Code |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------|
| <b>Part 3. Disease treatment modality (Past and current treatments)</b> |                                                                              |                                                                                                                   |      |
| 301                                                                     | Any local treatment?                                                         | 1. Yes    2. No                                                                                                   |      |
| 302                                                                     | If <b>Yes</b> to the above the Q,<br>(circle all that applies)               | eg: 5-ASA (enema) /5-ASA<br>(suppositories)/Steroids (suppositories))                                             |      |
| 303                                                                     | Combination of drugs (2 or<br>more)                                          | 1. Yes    2. No<br>Specify _____                                                                                  |      |
| 304                                                                     | Systemic therapy (at any time<br>after diagnosis)<br>(circle all that apply) | 1. PO Steroids<br>2. PO Antibiotics<br>3. Immunomodulators- MTX/AZA<br>4. IV Steroids<br>5. Biologics- Infliximab |      |
| 305                                                                     | Initial Medical Therapy at<br>Diagnosis                                      | 1. Steroids<br>2. 5-ASA<br>3. Immunomodulators- MTX/AZA<br>4. Biologics- Infliximab                               |      |
| 306                                                                     | Response to initial medical<br>therapy                                       | 1. Yes<br>2. No                                                                                                   |      |
| 307                                                                     | Current maintenance<br>medication                                            | 1. PO Steroids<br>2. Immunomodulators- MTX/AZA<br>3. Biologics- Infliximab                                        |      |
| 308                                                                     | Duration of steroid and/or<br>immunosuppressant use (yrs)                    | _____                                                                                                             |      |
|                                                                         |                                                                              |                                                                                                                   |      |

|     |                                                      |                                                                                                                                                                              |  |
|-----|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 309 | Challenges faced in treatment<br>(Treatment impacts) | 1. Cost<br>2. Availability<br>3. Side effects<br>4. Pill burden<br>5. Adherence (reluctance to take medications)<br>6. Others                                                |  |
| 310 | Encountered side effects of drug (s) used            | Steroid induced (Cushingoid, DM, osteoporosis,<br>Cytopenias from AZA/MTX<br>Hepatotoxicity<br>Others _____                                                                  |  |
| 311 | Ever Surgery?                                        | 1. Yes<br>2. No<br>If Yes, how many times _____                                                                                                                              |  |
| 312 | If Yes to Q 306, indication (s) for surgery          | 1. Stricturing CD<br>2. Penetrating CD<br>3. Intestinal obstruction<br>4. Toxic megacolon<br>5. Cancer<br>6. Others                                                          |  |
| 313 | Type of surgery                                      | 1. Intestinal/bowel resection<br>2. Colectomy<br>3. Ileoanal pouch surgery<br>4. Strictureplasty<br>5. Fistulotomy, fistulectomy,<br>6. Others __ (abscess drain, diversion, |  |
| 314 | Outcome of surgery (improvement)                     | 1. Yes<br>2. 2. No                                                                                                                                                           |  |

|     |                                           |                                                                                                  |  |
|-----|-------------------------------------------|--------------------------------------------------------------------------------------------------|--|
| 315 | Post op (post-surgery) chemotherapy       | 1. Yes<br>2. No<br>If <b>Yes</b> , specify _____                                                 |  |
| 316 | Disease Course (at the time of inclusion) | 1. Single episode<br>2. Chronic continuous<br>3. Intermittent flares                             |  |
| 317 | Outcome                                   | 1. Discontinued medical therapy<br>2. Indefinite medical therapy<br>3. Colectomy / other surgery |  |



