Addis Ababa University

College of Medicine and Health Science

Department of Internal Medicine

Trend Analysis of Adult Colonoscopy Evaluation Outcomes in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia

(A 4 - year retrospective analysis)

A thesis submitted to the Department of Internal Medicine in partial fulfillment of the requirements for specialty certificate in internal medicine.

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Topic

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ACRONYMS AND ABBREVIATIONS

AAU: Addis Ababa University

BLH: Black lion Hospital

CCD: Charge Coupled Device

CIR: Cecal Intubation Rate

CRC: Colorectal Cancer

CT: Computerized Tomography

ETB: Ethiopian Birr

GC: Gregorian calendar

GI: Gastrointestinal

IBD: Inflammatory Bowel Diseases

IBS: Inflammatory Bowel Syndrome

MRN: Medical Recorded Number

NaP: Sodium Phosphate

PEG: Polyethylene Glycol

SPSS: Statistical Package for Social Science

TASH: Tikur Anbesa Specialized Hospital

TB: Tuberculosis

UC: Ulcerative Colitis

USA: United States of America

USD: United States Dollar

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Abstract

Background: Colonoscopy procedure is an accepted modality for the evaluation of colonic diseases. It performed for both diagnostic and therapeutic indications. Centers performing colonoscopy in the developing world is being limited for reasons of lack of adequate man power training, better equipment supply and improved knowledge of patients to seek care in addition to a shift in the increasing trend of gastrointestinal malignancies. Reports on the practice trend of endoscopy in general and colonoscopy in particular, in Ethiopia are limited and most are older studies.

Objective: The main objective of the study was to analyze colonoscopy indications and outcomes at GI Unit, Tikur Anbessa Specialized University Hospital, Addis Ababa, Ethiopia.

Patients and Methods: This was Institution based retrospective cross sectional study conducted at Tikur Anbessa Specialized Hospital GI Unit on 659 patients undergone colonoscopy evaluation from September 2016 to August 2020.

Results: The mean age of patients in the study was 45.5 years with SD ±16.4. Majority of patients were from Addis Ababa. Rectal bleeding (28.8%) was major indication for colonoscopy. Most of the colonoscopies done after excellent and good preparation (85%). Cecal intubation rate was 85% and had statistically significant association with degree of bowel preparation. The main reason for failed intubation of the cecum was mass (42.6%). Normal and mass were found in 37.2% and 14.4 % of colonoscopies respectively. 86.4% of histologic diagnosis were colonic adenocarcinoma and most (77.8%) found in rectosigmiod and descending colon area. There were significant number of reports of nonspecific inflammation.

Conclusions: The common indication for colonoscopy was rectal bleeding and majority of adenocarcinomas were on the left side of the colon. Mass lesion was the common reason of failed cecal intubation. There were significant number of reports of nonspecific inflammation.

Key word: Colonoscopy, Colonic disease, Indication, Findings, Ethiopia.

1. Introduction

1.1 Background

Colonoscopy is an established procedure in the workup and screening of patients with lower gastrointestinal symptoms. It remains a current practice in many parts of the world to refer such patients for colonoscopic examination and double-contrast barium enema [1–3]. Colonoscopy is performed for both diagnostic and therapeutic indications. Diagnostic indications include screening or surveillance for colon cancer, evaluating signs and symptoms suggestive of possible colonic or distal small bowel disease, assessing a response to treatment in patients with known colonic disease (e.g., inflammatory bowel disease), and evaluating abnormalities found on imaging studies. Therapeutic indications include stricture dilation, stent placement, colonic decompression, and foreign body removal. In addition, lesions found during diagnostic procedures may require therapeutic intervention (e.g., polypectomy or treatment of a bleeding lesion[4–6].

The demand for Colonoscopy has been increasing over the years, given the relative safety and the low complication rate associated with the procedure[7,8]. Data has been reported from our part of the world documenting the value of colonoscopy in the diagnosis of colonic disease[9–12]. Colonoscopy can reduce the risk of death from colorectal cancer through detection of tumors at an earlier, more treatable stage and through removal of precancerous adenomas[13,14]. It has been argued that colonoscopic screening is dangerous, expensive, and requires specialized skills. It has, therefore, been suggested that it should only be undertaken in those patients who will derive the most benefit, and that stricter selection criteria should be used to optimize a colonoscopic service[15].

Despite these observations, colonoscopy remains an accurate, reliable, and safe procedure to investigate patients with colonic disease[2,16]. Some form of patient selection based on the indications is advisable, since the available resources are always limited. Colonoscopy may be carried out for a variety of reasons such as to investigate the cause of gastrointestinal (GI) hemorrhage, abdominal pain, unexplained changes in bowel habit, suspicion of malignancy, or an abnormality found on abdominal ultrasound, colonic X-rays, barium enema or a computerized tomographic (CT) scan. Individuals with a previous history of polyps, colon cancer and those

with a family history of non-colonic cancers or colonic disorders that may be associated with colon cancer may also undergo periodic colonoscopies[17–20].

Multiple quality indicators have been proposed for colonoscopy including cecal intubation rates, withdrawal times, and adenoma detection rates[21]. The goal of applying quality indicators is to improve colonoscopy performance and decrease the number of lesions missed during colonoscopy. Colonoscopists have acceptable cecal intubation rates. Effective colonoscopists should be able to intubate the cecum in ≥90 percent of all cases and in ≥95 percent of cases when the indication is screening in a healthy adult[21].

After colonoscopy evaluation, there are many findings such as polyp, stricture, hemorrhoid, ulcer/erosion, diverticula, bleeding vascular lesions, mucosal pathology and others.

In this study, the definition of significant findings based on certain positive results on colonoscopy. A normal colonoscopy not considered significant, although this may be relevant to patient care as it may rule out a serious disease in the colon during surveillance.

1.2 Statement of the problem

Ethiopia is a country in the sub-Saharan Africa with the current population number of 109,252,833 according to the 2017 revision of world population prospects[22]. The GI diagnostics available in referral, regional as well as private health set ups are very much limited and poorly organized to meet the growing demands in addition to already existing burdens of colonic diseases. For this reason, there has been increasing trend of patient referral to tertiary and Private GI centers for diagnostic and therapeutic colonoscopic study from all corners of the country. This leads to an increased in observations that many patients diagnosed to have advanced forms of CRC, IBD, Intestinal and abdominal TB, other infectious colonic diseases at younger age posing a barrier in early diagnosis ,intervention &surveillance of lower GI diseases.

In addition according to the International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization (GLOBOCAN) statistics which was released 12th December 2013, report the three most commonly diagnosed cancers worldwide were those of the lung (13%), breast (11.9%), and colorectal (9.7%). From the report, there were 847,000 new cancer cases (6% of the world total) and 591,000 deaths (7.2% of the world total) in the 54 countries of Africa in 2012, with 75% in the 47 countries of Sub-Saharan Africa. Colonoscopy and polypectomy interrupt adenoma-carcinoma sequence and reduces the incidence of CRC by as

much as 90%[23]. Even though the number of endoscopic centers are increasing in arithmetic way in Ethiopia, most are located in the urban settings and fully supervised and accredited endoscopists run few of them. In addition, the practice trend and outcome analysis of the available centers is not being done on regular basis, and those few studies focusing the issue are small in number, older and none of them associated the histologic reports with clinical and endoscopic evaluation out comes. Reviewing the practice in large tertiary center like Tikure Anbessa on context of the aforementioned scenario, will help to have the basis for planning & expanding scope services across the nation with limited resources.

Hence, this study aims to fill this gap by analyzing the major indications, colonoscopy evaluation and histologic study outcomes of patients who completed the procedure from September 2016 to August 2020 at Tikur Anbessa Specialized Hospital Endoscopy Unit.

1.3 Significance of the study

This study generated valuable inputs from analysis of colonoscopy evaluation outcome of patients under gone the procedure for specific indications. This in turn will help to narrow the theoretical as well as the practical knowledge gap in GI scope practice plus it will serve as evidence based platform for planning, expanding and practice of scope services in the face of limited resources capacity. Given the socioeconomic similarities between Sub Saharan African countries, the results of this study could also be extrapolated to other African countries. The outcome of this study will help to alarm policy makers and other stakeholders to give great emphasis on generating more evidence and tackling the major factors that could contribute to low levels of practice.

2. Literature review

2.1 Colonoscopy

Colonoscopy is now the gold standard method for investigating most colonic symptoms. However, it is a demanding procedure that can be associated with low completion rates and significant complications, and it requires considerable skill to perform colonoscopy consistently well and safely[24].

It is first line investigation for large bowel diseases particularly for patients with colonic bleeding. This is because colonoscopy is potentially more accurate than barium enema for the diagnosis of colorectal neoplasm and in some cases treatment for example polypectomy can be under taken during the examination[11].

2.2 Preparation for colonoscopy

Preparation for colonoscopy typically involves the ingestion of a low-residue diet or clear liquids for at least one day prior to the examination, combined with an oral gastrointestinal lavage. Completion of the procedure and proper visualization of the intestinal mucosa are highly dependent on the quality of the bowel preparation. The ideal bowel preparation should be safe, well tolerated and effective. There is no bowel preparation method, which meets the ideal criteria for bowel cleansing prior to colonoscopy. However, polyethylene glycol-electrolyte lavage solution and sodium phosphate are the most commonly used bowel preparations before colonoscopy and colon surgery. NaP preparations appear more effective and better tolerated than standard PEG solutions[25]. An excellent bowel preparation is critical for colonoscopy because it permits visualization of the entire colonic mucosa and increases the safety of therapeutic maneuvers[26]. However, inadequate or poor preparation occurs in approximately 20 to 25 percent of colonoscopies in the United States[27]. Poor preparation leads to increased procedure time, risk of complications, and probability of missing lesions[28].

Bowel preparations graded base on Aron chick scale as unsatisfactory/inadequate, poor, fair, good, and excellent.

2.3 Indications, findings, Anatomic locations and histologic pattern of Colonic lesions

Colonoscopy performed for both diagnostic and therapeutic indications and with different result. A retrospective analysis by Endale Kassa of 640 patients who underwent 681 colonoscopic examinations between March 1984 and April 1996 was undertaken. The major indications were rectal bleeding (32.8%), change in bowel habit (24.7%), abdominal pain (20.1%), abnormal barium enema (9.8%) and iron deficiency anemia (4.8%). Total colonoscopy was performed in 79.3% of cases. The colonoscopic finding was normal in 49.8% of patients. Most of the lesions were benign. Polyps and carcinoma were found in 9.2% and 7% of patients respectively. 91.3%

of the lesions were located distal to the splenic flexure and of the remaining proximal lesions, polyps and carcinoma accounted for only 2.2%[1].

A one year retrospective study done at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia in 2020, the commonest indications for colonoscopy were rectal bleeding (34.8%), Constipation (14.0%), Diarrhea (12.6%) and abdominal pain (10.3%). 22.6% of patients had poor/inadequate bowel preparation. One hundred forty-six (24%) of colonoscopies did not intubate the cecum. The main reason for this was completely obstructing mass that prevented further advancement of the scope in 53.1% followed by poor bowel preparation. Colonoscopies were normal in 27.5% of patients. P-value <0.05 showing a significant association between the degree of bowel preparation and colonoscopy completion rate[29].

A study done in Soba University Hospital in Khartoum, Sudan a total of 123 patients was included in the study with a mean age of 46.7 years. Indications for colonoscopy included abdominal pain, altered bowel motions, rectal bleeding and iron deficiency anemia. Polyps were found in 15% of cases and colorectal cancer in 11%[30].

A cross sectional survey conducted over a two year period (1996 -1997) in Kenyan African patients the major indications for colonoscopy were lower abdominal pain (35.6%), non-bloody diarrhea (22.3%), constipation (21.4%) and rectal bleeding (19.8%). Nearly 53% of patients colonoscoped had abnormal mucosal findings, with the main abnormalities being: proctocolitis (20.2%), colorectal cancers (12.1%), hemorrhoids (7.3%), colorectal polyps (6.5%) and diverticulosis (5.3%)[31].

In Tanzanian retrospective study a total of 332 colorectal cancer patients were enrolled in the study, representing 4.7% of all malignancies. Males outnumbered females by a ratio of 1.6:1. The median age of patients at presentation was 46 years. The majority of patients (96.7%) presented late with advanced stages. Lymph node and distant metastasis at the time of diagnosis was recorded in 30.4% and 24.7% of cases, respectively. The recto sigmoid region was the most frequent anatomical site (54.8%) involved and adenocarcinoma (98.8%) was the most common histopathological type. The majority of adenocarcinomas (56.4%) were moderately differentiated. Mucinous and signet ring carcinomas accounted for 38 (11.6%) and 15 (4.6%) patients, respectively[32].

Study at Tanta University Hospital the middle of Nile delta of Egypt Colonoscopy revealed a diagnosis of ulcerative colitis (UC) in 22%, hemorrhoids in 18%, CRC in 15%, benign colorectal

polyps in 9%, Crohn's disease (CD) in 3%, diverticulosis in 2%, and anal fissures in 2% of patients. No organic colonic disease was found in 28% of patients[33].

Another study a hospital-based cross-sectional study carried out at the Endoscopy unit of Crescent hospital, Ilorin Nigeria; from January 2010 to May 2012, 103 patients had colonoscopy. The indications for colonoscopy were rectal bleeding 41 (39.8%), suspected colon cancer 32 (31.1%), chronic constipation and chronic diarrhea nine each (8.7%), abdominal/anal pain five (4.9%), suspected anorectal cancer and enter cutaneous fistula two each (1.9%), fecal incontinence, occult gastrointestinal bleeding, post-colostomy for Hirsch sprung disease one each (1.0%). Endoscopic findings were normal findings 21 (20.4%), diverticulosis 17 (16.5%), polyps 16 (15.5%), hemorrhoids 16 (15.5%), anorectal cancer 13 (12.6%), angiodysplasia 12 (11.7%), colon cancer eight (7.8%), colitis 7 (6.8%), anorectal ulcer 4 (3.9%), anal warts two (1.9%), anal fissure, caecal tumors, fecal impaction and proctitis one each (1.0%)[34].

A tertiary healthcare facility in Southwest Nigeria there were 250 patients, the most common indication for colonoscopy was hematochezia 85 (34.0%), others were abdominal pain 46 (18.4%), suspected colonic cancer 27 (10.8%), constipation 27 (10.8%), and chronic diarrhea 22 (8.8%). Sixty-five (26%) patients had normal colonoscopy while various abnormalities were detected in 185 (74%) patients. The most common abnormalities were colonic polyps (23.2%), hemorrhoids (20.8%), diverticulosis (14.8%), colorectal tumor (12.1%), and colitis (4.0%)[35].

A 7 year (2008 - 2015) retrospective review of colonoscopy records from a single center in Zambia from 573 colonoscopy reports, the most common diagnosis was hemorrhoids (n=151, 26%), followed by tumors (n=96,17%)[36].

Study done in Tertiary care Hospital Karnataka, India the major indications were bleeding per rectum (25%), unexplained diarrhea or dysentery (16%), pain abdomen (15%) and suspected malignancy (13%). Other indications included suspected inflammatory bowel disease (IBD), subacute intestinal obstruction, anemia, mass per abdomen and suspected irritable bowel syndrome (IBS). More than one-third (35%) had normal colonoscopic studies. The most common pathology found was malignancy (24%) followed by the spectrum of proctocolitis (20%)[37].

Colonoscopy utilization and outcomes assessed from 2000 to 2011 in Portland, Oregon, USA. Total of 1,372,838 reports were analyzed. The most common reason for colonoscopy in patients aged < 50 years is evaluation of symptoms such as irritable bowel syndrome (IBS) (28.7%) and

bleeding or anemia (35.3%). In patients aged 50 to 74 years, colorectal cancer screening accounts for 42.9% of examinations. In patients aged > 74 years, surveillance for cancer or polyps is the most common indication. With increasing age, there was a shift from distal to proximal large polyps. The rate of proximal large polyps is higher in the black population compared with the white population (OR 1.19; 95% CI, 1.13-1.25)[38].

2.4 Quality measures in colonoscopy procedure

The effectiveness of colonoscopy is dependent on the quality of the procedure, which is assessed by a number of key quality indicators. Among them, cecal intubation rate is one the most commonly used indicators of quality of colonoscopy[39–43]. Quality indicators for colonoscopy assessed in Tunisian endoscopy unit of 859 colonoscopy cecal intubation rate (CIR) was 61.1 %. Causes of incomplete colonoscopy were especially poor preparation (47.3%) and poor tolerance (34.4%). Univariate analysis disclosed 3 predictive factors of CIR : the quality of bowel preparation (good vs fair or poor((67.2 % vs 31.3%, p = 0.0001,OR: 4.5, 95% CI: 3.3-6), the screening indication (72.9% vs 60.1% , p = 0.03, OR: 1.7, 95% CI: 1-3) and the presence of alarming signs (55% vs 43%, p=0.04; OR: 1.1, 95% CI:0.9-2.5). By multivariate analysis, the factors influencing independently the CIR were the quality of bowel preparation (p=10-3, OR=2.23, 95% CI: 1.47-3.3) and the screening indication (p=0.02, OR: 1.9, 95% CI: 1.1-3.4)[39].

In another study in South west Nigeria from 305 colonoscopies the crude CIR was 89.2%, whereas the adjusted CIR was 95.1%. Completion rate was higher in males, in patients who were younger than 58 years and in patients with adequate bowel preparation[40].

In UK prospective report involving 9223 colonoscopic studies, Cecal intubation was recorded in 76.9% of procedures but the adjusted caecal intubation rate was only 56.9%. Reasons for failing to reach the caecum included patient discomfort (34.7%), looping (29.7%), and poor bowel preparation (19.6%). A normal colonoscopy was reported in 42.1% of cases while only 17.0% of colonoscopists had received supervised training for their first 100 colonoscopies and only 39.3% had attended a training course. This signifies there is a wide variation in practice between units and training in colonoscopy is often inadequate and improved practice should result from better training even in country like UK[44].

3. Objective

General Objective:

- ✓ To analyze colonoscopic indications, colonoscopy & histologic study outcomes at Endoscopy Unit, Tikur Anbessa Specialized Hospital.

Specific Objectives:

- ✓ To identify major colonscopic indications and outcomes in patients undergone colonoscopy evaluation.
- ✓ To describe the distribution of the major identified lesions across the colonic anatomy.
- ✓ To analyze pathologic report for patient's mucosal biopsy was taken.
- ✓ To measure cecal intubation rate and identify reasons for failed Intubation

4. Methods and materials

4.1 Study setting

Study area: The study project will conducted at Tikur Anbessa University Specialized Hospital, which is the largest referral hospital in the Ethiopia located in the capital Addis Ababa. The hospital is a tertiary teaching hospital under Addis Ababa University, College of Medicine and Health sciences. The Hospital is involved in undergraduate, postgraduate and fellowship trainings in different fields of clinical medicine. Clinical service is given for all discipline of internal medicine. Of them Gastroenterology and Hepatology unit is that responsible for care of patients with GI system pathology both as inpatients and outpatients. It receives referrals for gastroenterology consultations and endoscopy service mainly from government, private plus other primary and secondary health care facilities across the country at large The care to patients include doing colonscopy for those who have indications after senior gastroenterologist consultation. Colonoscopy done on daily basis on working hours for elective patients. The unit uses two scope rooms. Seven qualified gastroenterologist performs scope evaluation, the majority completed training on the same center and one fellow currently. The patients usually undergo a 3-day bowel preparation with the use of laxatives comprising Bisacodyl (Dulcolax)

and Caster oil syrup. They also placed on liquid diet during the period. The patients had intravenous lines, analgesia and sedation with 10 mg of diazepam. A digital rectal examination carried out, and thereafter the colonoscopy done using Storz machine model and Olympus CV 180 according to standard protocol.

Study period: This study analyzed a four -year colonoscopy evaluation done from September 2016 to August 2020.

4.2 Study Design

This was a facility based retrospective cross sectional study.

4.3 Source Population

The source population were all patients attended GI referral clinic in the study period and patients admitted to Tikur Anbessa Specialized Hospital for various medical or surgical reason.

4.4 Study population

All patients who had colonoscopy examination for specific indications in the study period.

4.5 Sample size and Sampling technique

The study included all patients undergone colonscopic examination in the study period.

4.6 Inclusion and exclusion criteria for patients

Inclusion criteria

- ✓ All patients who had colonoscopy evaluation in adult GI endoscopy unit.

Exclusion criteria

- ✓ Patients with incomplete data

4.7 Study Variables

Dependent variables:

- ✓ Colonoscopy diagnosis
- ✓ Cecal intubation
- ✓ Reason for not intubating the cecum
- ✓ Pathologic diagnosis

Independent variables:

- ✓ Age
- ✓ Sex
- ✓ Address
- ✓ Indications for colonoscopy
- ✓ Preparation for colonoscopy
- ✓ Anatomic location of a lesion

4.8 Data collection and procedures

Data collected from electronic database of colonoscopy registry and/or from colonoscopy report format if evaluation done before electronic database is incorporated. For those patients who had biopsy & pathologic report; information extracted from patient chart using MRN or Icare and from the colonoscopy evaluation report format or from pathology department registry. Focused training given to data collectors for one day to make them familiar with objectives and aims of the study; and how to extract relevant information from the database or patient chart or pathology report registry using systematic tool that entered on the prepared information sheet. A questionnaire completed for each patient. Continuous follow up and supervision done by the principal investigator.

4.9 Data analysis and presentation

Each collected data cleaned and checked for quality and analyzed by using SPSS version 25 statistical package. The data coded and entered to the computer and frequency, percentage determined. Then the analyzed data arranged in the sequential order in single table to help in communicating the results. The degree of association between dependent and independent variables assessed using crude odds ratio and 95% confidence interval.

4.10 Data quality assurance

Data collected with well-designed questionnaire from database. Completeness checked. Feasibility of questionnaire tested using a pilot study on ten selected patients with two different data collectors and the feedback from the pilot study used to amend the questionnaire and adjust it accordingly.

4.11 Ethical consideration

The study protocol submitted for approval to both ethical review committee of Department of Internal medicine and to Addis Ababa University, college of medicine and health sciences. After securing ethical clearance from the department, all concerned officials from the hospitals and respective departments informed about the study and their agreement for the continuation of the study obtained. Name of the patients not mentioned at any stage of the study.

4.12 Dissemination of the results

The results of the study presented to Addis Ababa University, college of public health and medical science Internal Medicine department. The results of the study will also be sent for reputable journals for publication.

4.13 Operational Definitions

- ✓ **Cecal intubation**: when the medial wall of the cecum was intubated.
- ✓ **Colonoscopy**: is the endoscopic examination of the large bowel and the distal part of the small bowel with CCD camera or fiberoptic camera on flexible tube passed through anus.
- ✓ **Polypectomy:** is a procedure used to remove polyps from different parts of gastrointestinal system

5. Result

5.1 Sociodemographic Characteristics

A total of 659 colonoscopies included in this 4-year retrospective study. Among this 381 (57.8%) were males and 278 (42.2%) were females with male to female ratio of 1.4:1. The mean age was 45.5 years with SD ±16.4 and ranges from 13 to 87 years. More than half 368 (55.8%) of colonoscopies done for patient come from Addis Ababa followed by Oromia 126 (19.1%), Amhara 93 (14.1%) and SNNP 52 (7.9%) regions.

Figure 5.1: Sex distribution

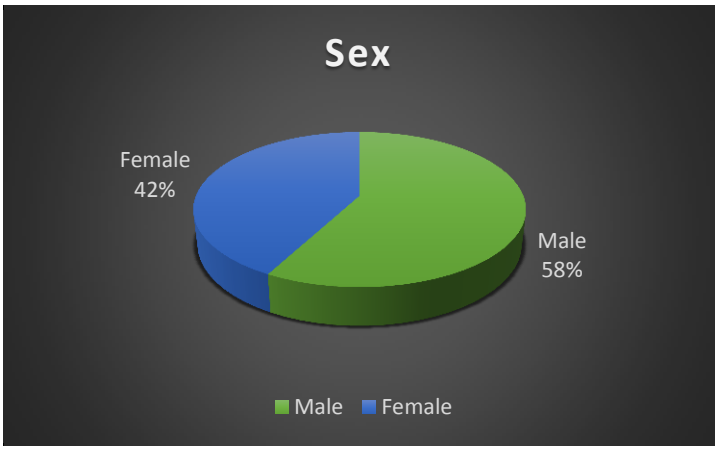


Table 5.1: Address patients

Address (region)	Frequency	Percent (%)
Addis Ababa	368	55.8
Oromia	126	19.1
Amhara	93	14.1
SNNP	52	7.9
Others	20	3
Total	659	100

5.2 Indication, preparation, cecal intubation and reason not intubated

The commonest indication for colonoscopy were lower GI bleeding 190 (28.8%), diarrhea 85 (12.9%), abdominal pain 82 (12.4%), colorectal cancer screening 75 (11.4%), Constipation 67 (10.2%) and abdominal swelling 38 (5.8%). Others 122 (18.5%) of indications includes Iron deficiency anemia, metastatic work up, post-surgery, abnormal imaging and perianal abnormalities. Most of the colonoscopies done after excellent and good preparation based on Aron chick scale 469 (71.2%) and 91 (13.8%) respectively. The remaining colonoscopies had fair 52 (7.9%), poor 41 (6.2%) and inadequate preparation 6 (0.9 %). Cecal intubation rate in this study was 85%. The remaining 99 (15 %) had colonoscopy below cecum at different level of large bowel. The main reason for failed intubation of the cecum was mass accounting 43 (42.6%) followed by poor preparation 24 (23.8%), Stricture/stenosis 21 (20.8%), looping 6 (5.9%) and patient intolerance 3 (3%).

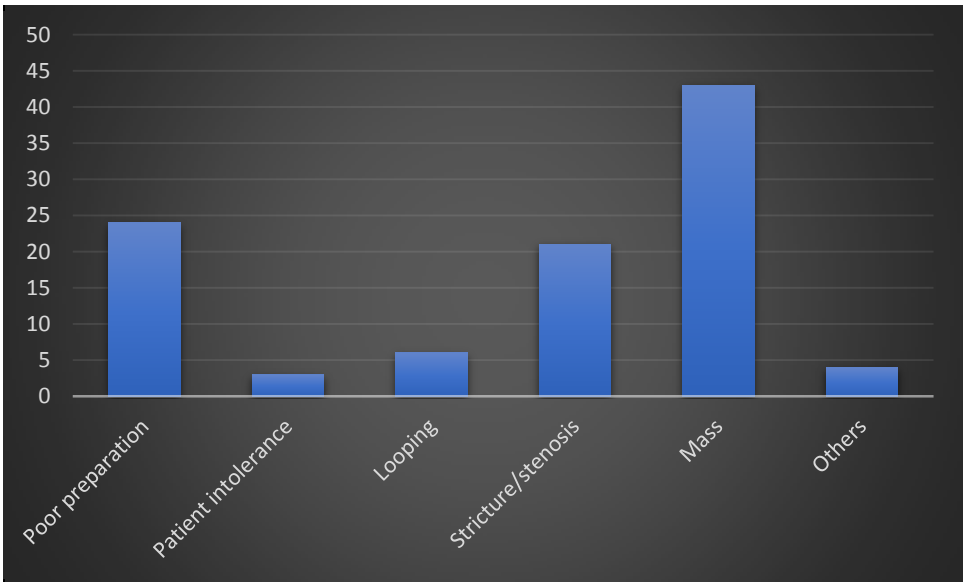
Table 5.2: Presenting Symptoms

Symptoms	**Frequency**	**Percent (%)**
Lower GI bleeding	190	28.8
Diarrhea	85	12.9
Abdominal Pain	82	12.4
CRC screening	75	11.4
Constipation	67	10.2
Abdominal swelling/mass	38	5.8
Others	122	18.5
Total	659	100

Table 5.3: Preparation (Aron chick scale)

Preparation	Frequency	Percent (%)
Excellent	469	71.2
Good	91	13.8
Fair	52	7.9
Poor	41	6.2
Inadequate	6	0.9
Total	659	100

Figure 5.2: Reason of failed intubation



The degree of bowel preparation had associating with cecal intubation rate. The cecal intubation rate was 88.2% for that excellent/good preparation and 66.7% for those with inadequate/poor preparation. This showing significant association between cecal intubation rate and degree of bowel preparation with (p – value 0.000; COR 3.742; 95% CI; 2.292-6.112). Female sex had significant association with better cecal intubation rate (88.8% Vs 82.2%, p- value 0.017) than males.

Table 5.4: Association b/n Cecal intubation rate with degree of bowel preparation and sex by Bivariate logistic regression

Variables		Frequency (%)		COR (95% CI)	P – value
		Cecum intubated	Cecum not intubated		
Preparation	Excellent and good	494 (88.2%)	66(11.8%)	3.742 (2.292-6.112)	**0.000**
	Poor and inadequate	66 (66.7%)	33 (33.3%)		
Sex	Female	247 (88.8%)	31 (11.2%)	0.578 (0.366-0.912)	**0.017**
	Male	313 (82.2)	68 (17.8%)		

5.3 Colonoscopy findings and anatomic locations

More than one third (37.2%) of colonoscopies were normal. Mass lesion found in 95 (14.4 %) cases and the most abnormal finding in the study. Hemorrhoidal diseases found in 74 (11.2%), polyp 67 (10.2%), mucosal inflammation 62 (9.4%), ulcer/erosion 35 (5.3%), and stricture/stenosis 23 (3.5%) of cases. Other findings were radiation proctitis, diverticulitis, intussesption, features of crohns or ulcerative colitis, vascular lesions, extralumenal compression and fistula in ano accounts for the remaining 8.8%. Most pathologies were rectal (36.5%) followed by sigmoid (10.6%), anorectal (9.4%), anal (8.5%), cecal (7.2%), ileum (6.8%), ascending colon (6.3%), descending colon (5.1%), transverse colon (4.6%) and remaining 5% in ileocecal, hepatic and splenic flexure. Biopsy taken for 255/659 (38.7%) colonoscopies.

Table 5.5: Colonoscopy findings

Finding	**Frequency**	**Percent (%)**
Normal	245	37.2
Mass	95	14.4
Hemorrhoid	74	11.2
Polyp	67	10.2
Mucosal inflammation	62	9.4
Ulcer/Erosion	35	5.3
Stricture/Stenosis	23	3.5
Others	58	8.8
Total	659	100

Figure 5.3: Colonoscopy findings

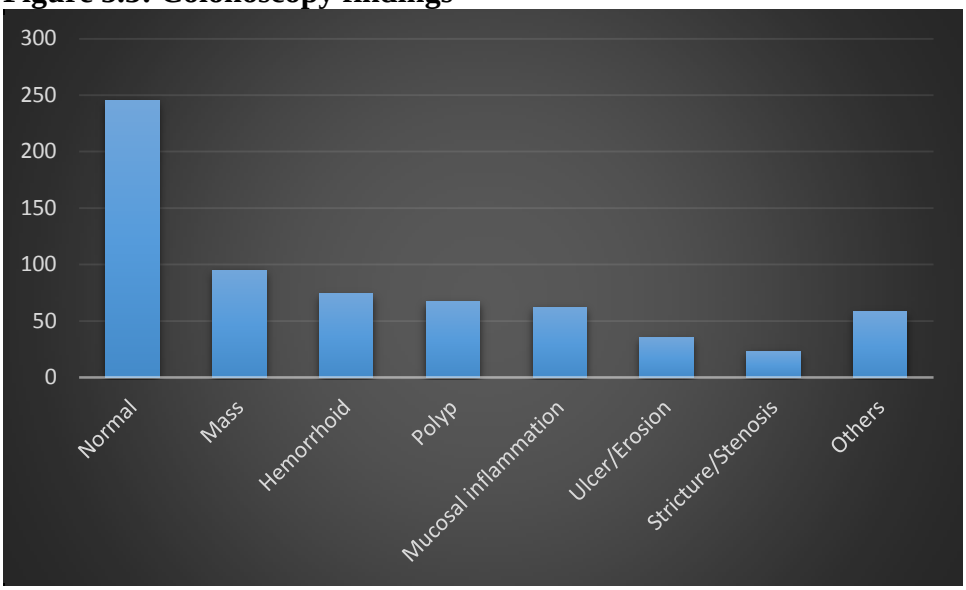


Table 5.6: Anatomic location

Anatomic location	Frequency	Percent (%)
Ileum	28	6.8
Ileocecal	17	4.1
Cecum	30	7.2
Ascending colon	26	6.3
Hepatic Flexure	1	0.2
Transverse colon	19	4.6
Splenic Flexure	3	0.7
Descending colon	21	5.1
Sigmoid	44	10.6
Rectum	151	36.5
Anus	35	8.5
Anorectal	39	9.4
Total	414	100

5.4 Histologic finding

Histology diagnosis of malignancy was found in 88/659 (13.4%) of colonoscopies in which most of them were adenocarcinoma 76/88 (86.4%), remaining 13.6% were accounts for squamous cell, undifferentiated carcinoma and lymphomas. The second common histologic diagnosis was polyp accounts 52/659 (7.9%) in which near two third 33/52 (63.5%) were adenomatous polyp, 28.8% hyperplastic polyp and 7.7% (4/52) juvenile polyps. There is a report of nonspecific inflammation in 7.9% colonoscopies. Crohns diseases and ulcerative colitis were accounts 5.5% and 1.8% respectively. Other histologic findings were vascular lesions, schistosomiasis and tuberculosis colitis that accounts 2.3% of colonoscopies. Most of adenocarcinoma (77.8%) found on the left side of colon below splenic flexure.

Table 5.7: Histologic diagnosis

Histology diagnosis	Frequency	Percent (%)
Malignancy	88	13.4
Polyp	52	7.9
Nonspecific inflammation	52	7.9
Crohns diseases	36	5.5
Ulcerative colitis	12	1.8
Others	15	2.3
Total	255	38.7

Figure 5.4: Type of Polyp

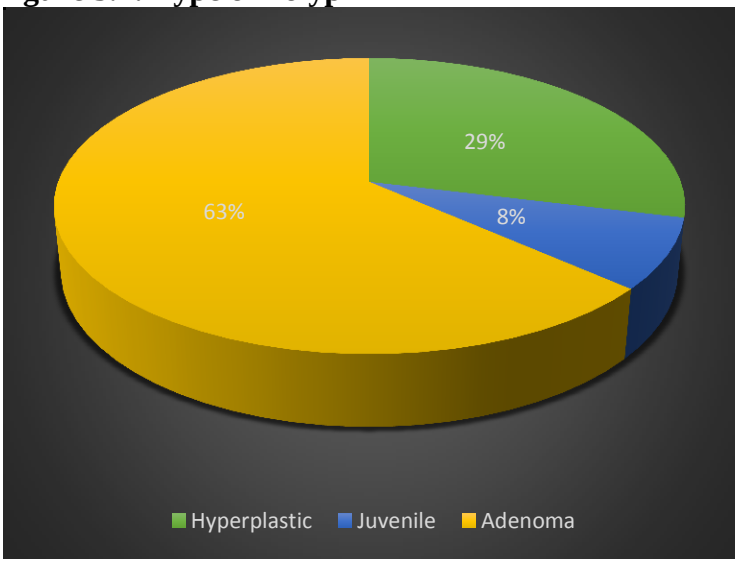
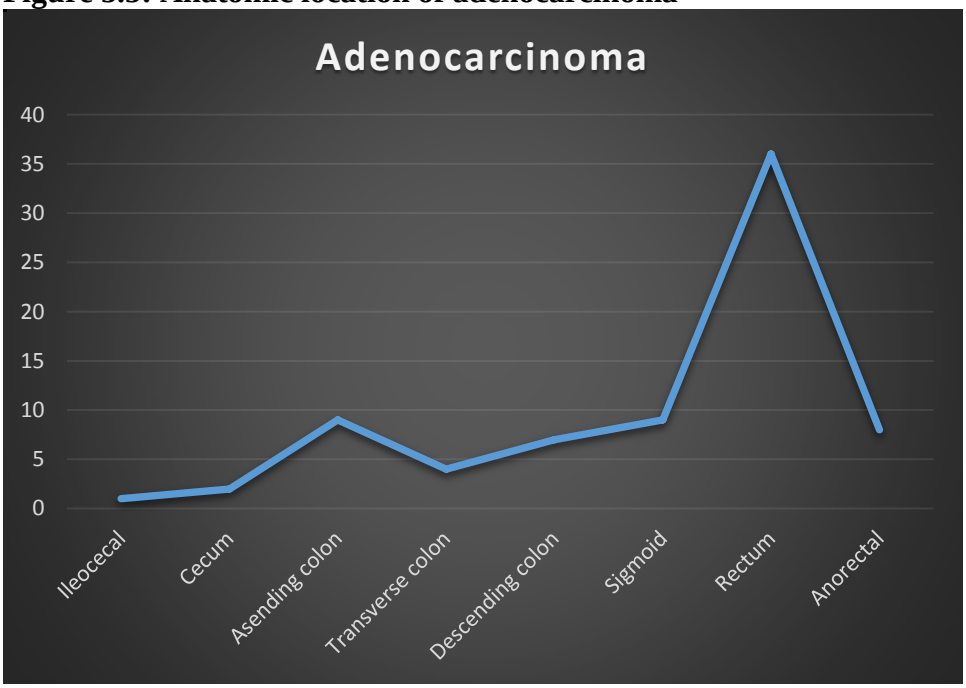


Table 5.8: Anatomic location of adenocarcinoma

Location	Frequency	Percent (%)
Ileocecal	1	1.3
Cecal	2	2.6
Ascending colon	9	11.8
Transverse colon	4	5.2
Descending colon	7	9.2
Sigmoid	9	11.8
Rectum	36	46.3
Anorectal	8	10.5

Figure 5.5: Anatomic location of adenocarcinoma



There was no statistically significant association between age, sex and indication with histology finding of between adenocarcinoma and other malignancies in this study. (p – value > 0.05) (Table 5.9)

Table 5.9: Multivariate Logistic regression of association of age, sex and colonoscopy Indication between Adenocarcinoma and other malignancies.

Variables		Frequency (%)		COR (95% CI)	**P – value**
		Adenocarcinoma	Other malignancy		
Age	--	--		1.013 (0.973 – 1.055)	0.519
Sex	Female	31 (79.5%)	8 (20.5%)	0.338 (0.086 – 1.324)	0.119
	Male	45 (91.8%)	4 (8.2%)		
Colonoscopy Indication	Diarrhea	3 (100%)	0 (0%)	--	0.999
	Constipation	9 (100%)	0 (0%)	--	0.999
	Lower GI Bleeding	24 (80%)	6 (20%)	1.595 (0.273-9.306)	0.604
	Abdominal pain	4 (80%)	1 (20%)	1.321 (0.090-19.483)	0.839
	Abdominal swelling/mass	12 (85.7%)	2 (14.3%)	1.341 (0.155-11.639)	0.790
	CRC screening	10 (90.9%)	1 (9.1%)	0.896 (0.067-11.908)	0.934

6. Discussion

The main aim of this study was to analyze colonoscopic indications, colonoscopy & histologic study outcomes at endoscopy unit, Tikur Anbessa Specialized Hospital. In this retrospective study, mean age of patients was 45.5 years, which is similar with Sudanese and Tanzanian study with mean age of 46.7 and 46 years respectively[30,32]. The commonest indication were rectal bleeding, diarrhea, abdominal pain and colorectal cancer screening. These were also the major indications for colonoscopy in studies done in Sudan, Kenya, Nigerian and India[30,31,35,45]. This is also similar with study conducted by Endale Kassa 1996 in our hospital and study conducted at St. Paul's Hospital Millennium Medical College. In those study rectal bleeding, change bowel habit change and abdominal pain were the leading indications for colonoscopy[1,29].

Eighty five percent of colonoscopy done after excellent and good bowel preparation. This is encouraging since up to 20 to 25 % colonoscopies had inadequate and poor preparation in western studies[27]. However, our patients usually undergo a 3-day bowel preparation with laxatives, comprising bisacodyl, castor oil syrup and placed on liquid diet during the period. Indeed polyethylene glycol-electrolyte lavage solution and sodium phosphate are the most commonly used bowel preparations before colonoscopy[25].

The cecal intubation rate was 85% and better than study done in Tunisia and United Kingdom which are 61.1% and 76.9% respectively[39,43]. It is also higher than study done at St. Paul's Hospital Millennium Medical College who had 76% cecal intubation rate[29]. This could be due to most of colonoscopy was done by experienced consultant gastroenterologist. However, there is a better Cecal intubation report in research conducted in south west Nigeria 89%[40]. The commonest reasons for failed intubation were mass (42.6 %) followed by poor preparation (23.8%) in contrary to above-mentioned studies. Obstructing mass also the main reason for incomplete colonoscopy in recent St. Paul's Hospital Millennium Medical College study. In Tunisian and United Kingdom studies, poor preparation (47.3%) and patient discomfort (34.7%) was the main reason of failed intubation respectively. Late presentation of our patient once the diseases advanced and mass lesion narrowed bowel lumen may be the reason.

There was strong association between degree of bowel preparation and cecal intubation rate with significant p – value similar with St. Paul's Hospital Millennium Medical College study[29]. Female sex had strong association with higher cecal intubation rate than males, which needs

further study and explanation.

More than one third (37.2%) of colonoscopies were reported as normal. This was in contrary with Endale Kassa study in which 49% of colonoscopies were normal[1]. Increased rate of patient referral for lower GI evaluation, increased prevalence of lower GI pathologies and increased human power and experts in the unit could be responsible for this finding. But comparable with studies done in India, 35% of colonoscopies were normal [34]. Mass lesions, hemmoriodal diseases and mucosal inflammations are commons abnormal findings of colonoscopy.

Malignancy was the commonest (13.4%) pathologic finding in this study followed by polyp (7.9%). This was contrary with Endale Kassa's study by which most of the lesions were benign[1]. In that study polyp and carcinoma were found in (9.2%) and (7%) of patients respectively. Increased awareness of the community, increased colonoscopy services and patient factors could be the reason for change in prevalence of malignancy, so that it needs well-designed study to know the exact reason. However, this study consistent with study conducted in Soba University Hospital in Khartoum, Sudan that of 11% report of colorectal cancer[30].

Adenocarcinoma was the commonest histopathologic type. Rectosigmiod and descending colon region were the most frequent 77.8% anatomic site involved by adenocarcinoma. Similarly majority 91.3% of lesions in Endale Kassa study were distal to splenic flexure[1]. This was also consistent with studies done in Kenya, Tanzania and Nigerian[31,32,40]. This finding indicates that in resource limited set up like Ethiopia where few colonoscopy services and Gastroenterologist, giving short-term training for physicians who worked in peripheral hospitals on recto sigmoidoscopy could be an option to pick colorectal malignancy early. Because most of our patients presented once the diseases advanced. Unlike other literatures, histologic report of nonspecific inflammation was significant, 7.9%. This was not there in most of studies. High prevalence gastroenteritis in our set up which give nonspecific inflammation, inadequate tissue sample, early inflammatory bowel diseases or after remission were the explanation given by pathology department. This alert us to work closely with pathology department to reach a specific diagnosis and narrow the gap. This is important to initiate treatment before diseases advanced. Because from those patients some of them of those patients end up with inflammatory bowel diseases when biopsy repeated or done in outside laboratories. Improve capacity of pathology department should be also considered.

There is no statistically significant association of age, sex and colonoscopy indication between

histologic diagnosis of adenocarcinoma and other malignancies.

Inflammatory bowel diseases accounts for 7.3% of the cases. From these crohns diseases predominate with 5.5% followed by ulcerative colitis with 1.8%. However ulcerative colitis were major inflammatory bowel diseases with 22% in study conducted at Tanta University Hospital the middle of Nile delta of Egypt. Crohn's disease reported only in 3% of colonoscopies[33]. Even if there were report of juvenile and hyperplastic polyp, majority of (63.5%) polyps were adenomatous.

7. Conclusion

In conclusion, the common indication for colonoscopy was rectal bleeding and majority of adenocarcinomas were on the left side of the colon. Mass lesion was the common reason of failed cecal intubation and statistically significant association between degree of bowel preparation and cecal intubation. There were significant number of reports of nonspecific inflammation.

8. Limitation of the study

The limitation of the study was, patient's histologic report lost once biopsy taken and sent to pathology, which could be, affect our result. This will reduced by doing prospective studies for the next time.

9. Recommendation

We recommend prospective study, which includes additional patient's characteristics to know further of colonoscopy services in our setup.

We recommend additional effort to incorporate histologic reports in to unit database and improve data handling of pathology department.

We recommend regular and continuous communication between departments to improve care of patients.

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Annex – I

QUESTIONNAIRE

This is a questionnaire prepared to evaluate ***a 4 year retrospective trend analysis of adult colonoscopy evaluation out come at TASH GI unit***. A thesis submitted to the Department of Internal Medicine in partial fulfillment of the requirements for specialty certificate in internal medicine.

The data will be collected from colonoscopy registration database and from patient card or I care if biopsy taken from the pathologic report in pathology department.

It should be collected by trained person.

Date of data collection _____MRN/I care card_____

Date of colonoscopy done_____

1. Sociodemographic characteristics		
Number	Questions	Coding categories
101	Age	_____
102	Sex	Male……1 Female……2
103	Address	_____
2. Regarding to symptom/sign		
201	Indication for colonoscopy (one patient can have more than one symptom/sign)	Chronic Diarrhea……..…1 Constipation ……2 Bleeding per rectum…….3 Tenesmus ……4 Weight loss……..5 Hemorrhoid…….6 Bloating……...7 Abdominal pain ……..8 Abdominal Swelling……9 Post-surgery……10

		CRC screening…….11 Metastatic workup……...12 Iron deficiency anemia……13 Radiation exposure …….14 Other (specify)…….15
3. Colonoscopy evaluation		
301	Preparation (Aron chick scale)	Excellent……....1 Good ……..2 Fair…….3 Poor ……..4 Inadequate……..5
302	Cecal intubation	Yes……1 No…….2
303	If the answer for question number 3.2 is NO what is the reason of NOT intubated	Poor preparation…….....1 Patient intolerance …....2 Looping …….....…..3 Stricture…….4 Mass ……..5 Other (specify)……6
304	Findings of colonoscopy	Normal……...1 Abnormal…..2
4. If the answer for Question number 304 is abnormal		
401	What type of abnormality?	Mass…….....1 Polyp…….....2 Stricture/stenosis……..3 Ulcer/erosion…….....4 Hemorrhoid……...5 Bleeding……6 Mucosal inflammation……..7 Diverticula……8 Vascular lesions…….....9

		Other (specify)…….10
402	Location of abnormality	Ileum……1 Ileocecal ……..2 Cecum ……3 Ascending colon……..4 Hepatic flexure ……5 Transverse colon……..6 Splenic flexure…….7 Descending colon……8 Sigmoid……...9 Rectum……10 Anorectal…….....11 Anus……12
403	Number of abnormality	_____
404	Estimated mass size in cm	_____
405	Biopsy taken?	Yes……..1 No……....2
5. If Question number 405 is yes		
501	What is Histology diagnosis?	Normal…….1 Ulcerative colitis……..2 Cohn's disease……..3 Lymphoma…….....4 Colorectal Cancer…….....5 Polyp…….6 Vascular anomalie.…….....7 TB colitis……..……8 Nonspecific inflammation….9 Others (specify)……..10
502	If the answer for Question number 501 is Colorectal Cancer, what is the	Adeno carcinoma ……1 Neuroendocrine ……....2

	type?	Undifferentiated ……...3
503	If the answer for Question number 501 is polyp, what is the type?	Hyperplastic……..1 Juvenile ….....…….2 Adenoma……...3

Annex – II

CV of Investigators

1. Principal Investigator

Full name: Dr. Addis Dessie Agmas
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Current position: Internal medicine resident at Addis Ababa University
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Nationality: Ethiopian
Language: Amharic and English
Higher Education:

- ✓ Graduated with Degree of Doctor of Medicine from Bahirdar University medical faculty in 2016

Postgraduate study:

- ✓ Internal medicine resident in Addis Ababa University Tikur Anbesa Hospital Since 2018

Professional experience:

- ✓ 2017 to 2018 served as lecture at Bahirdar University college of medicine and health science

Professional Organization:

- ✓ Member of Ethiopian medical association since 2019

2. Advisor

Full name: Dr. Mengistu Erkie Minaye
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Current position:

- ✓ MD, Consultant Internist Gastroenterologist & Hepatologist at Addis Ababa University, Tikur Anbesa Hospital
- ✓ Vice Chair Department of Internal Medicine at Addis Ababa University, Tikur Anbesa Hospital
- ✓ President, Ethiopian Gastroenterology Association

Nationality: Ethiopian
Language: Amharic and English

Educational Background:

- ✓ Graduated with Degree of Doctor of Medicine from Addis Ababa University Medical Faculty in 2003/2004.
- ✓ Postgraduate Specialty in Internal Medicine, Addis Ababa University, Medical Faculty from 2008 to 2010.
- ✓ Subspecialty in Gastroenterology & Hepatology, Addis Ababa University in collaboration with Toronto University, Bergen university, Christian Medical Collage, CMC Vellor, India from 2013 to 2015.

Professional experience:

- ✓ Lecturer in Gondar College of Medical Sciences from 2003/2004 to 2006.
- ✓ Lecturer in Defense College of Health Sciences, Armed Forces General Teaching Hospital from 2006 to 2008.
- ✓ Chief Resident in the Department of Internal Medicine, College of Health Sciences, Addis Ababa University from 2009 to 2010.
- ✓ Assistant professor of Medicine, Clinical consultant, Head of Department of Internal Medicine Sciences from 2010 to 2014.
- ✓ Consultant Internist, Gastroenterologist& Hepatologist, AFRTH at Addis Ababa University, College of Health Sciences, School of Medicine since 2016
- ✓ Since January 2019, Junior Research Fellow, Medical Education Partnership Initiative, MEPI, Addis Ababa University in collaboration with Emory and John Hopkin's Universities.

Professional organization:

- ✓ Chairman of Founding Committee and First Elect President of Ethiopian Society of Internal Medicine from 2013 to 2016.
- ✓ President of Ethiopian Gastroenterology Association since September 2017.
- ✓ Active Member of the Ethiopian Medical Association.

Main Scientific publications:

- ✓ Wrote a case report entitled "steroid secreting tumor of the ovary not specified otherwise variant" and published in the Ethiopian Medical Journal" in 2009
- ✓ Have done research entitled "Magnitude and Correlates of Depression in Diabetic Patients at Tikur Anbessa and St. Paul Tertiary Referral, Teaching Hospitals*"* Addis Ababa, Ethiopia. With a total sample of 314 patients Under the supervision of Prof. Yewyenhareg Feleke, Consultant Internist and Endocrinologist, Department of Internal Medcine, School of Medcine, AAU. Published in Ethiopian Medical Journal 2014.

Ongoing research activities

- ✓ Validation of Nutritional Screening tools in hospital setting to be used as a simple clinical tool for effective Clinical Intervention.
- ✓ Prevalence and complications of GERD by employing both GERD Q questioner & Endoscopic Assessment.
- ✓ Determining the efficacy of HBV immunization by measuring the protective titer among Vaccinated Ethiopian Adults.

Annex III - 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: Addis Dessie (MD, Internal Medicine Resident)

Signature: …….

Date of Submission: January 8, 2021

This thesis has been submitted with my approval as advisor.

Advisor: Mengistu Erkie (MD, Internist, Gastroenterologist and Hepatologist)

Signature: …….

Date: …….

Place: Addis Ababa, Ethiopia