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Endoscopic Diagnosis and Treatment of Upper Gastrointestinal Tract Disorders - A Single Hospital Experience, Aden, Yemen

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Abstract

Introduction: The study aimed to describe the clinical presentation of patients, endoscopic findings and interventions carried out in 22 May Hospital during 2018. It aimed also to analyze the endoscopic findings of the most common clinical presentation.

Methods: All available electronic reports of upper gastrointestinal endoscopies (UGIEs) which were performed in the study hospital during the study period were collected and reviewed retrospectively. Relevant data were extracted. Descriptive and analytic statistics were performed. To find out association between variables in regarding to endoscopic findings, Fisher's exact test was carried out with the Statistical Package for Social Sciences (SPSS version 17). The *p*-value of <0.05 was considered statistically significant.

Result: A total of 350 esophagogastroduodenoscopy (EGD) reports were evaluated. It included 229 males and 121 females, whose mean age was 44.2±17.1 (ranged 2-100) years. The most common indication for EGD was epigastric pain in both genders (total=146; males=81, females= 65). The most common endoscopic finding was gastritis in both genders (total=143; males=76, females=67). The most common endoscopic intervention was esophageal rubber band ligation of esophageal varices 51. Of all endoscopic examinations, 8.6% were performed in malignancies with different sites and stages. A statistical association was found between age and gastric cancer, among patients who were complaining from epigastric pain (p <0.001).

Conclusion: Epigastric pain was the main indication for UGIEs and gastritis was the most commonly observed disease. Epigastric pain should be taken cautiously among patients with advancing age, and need endoscopic evaluation to rule out gastric cancer. The study highlighted the importance of the diagnostic and interventional use of UGIEs in Yemeni patients.

Keywords: Upper Gastrointestinal Endoscopy, Endoscopic Intervention, Gastric Cancer.

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التنظير في تشخيص وعلاج اعتلالات الجهاز الهضمي العلوي – خبرة المستشفيات في أحد عدن، اليمن

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ملخص الدراسة

المقدمة: هدفت الدراسة وصف الأعراض السريرية ونتائج التشخيص والتدخلات بالتنظير الداخلي للمرضى الذين أجري لهم التنظير الداخلي للجهاز الهضمي العلوي في مستشفى 22 مايو، خلال عام 2018م. كذلك هدفت أيضاً تحليل نتائج التنظير للعرض السريري الاكثر شيوعاً.

المنهجية: تم جمع كل التقارير الإلكترونية المتاحة للمرضى المشمولين في الدراسة بطريقة استرجاعية. وقد استخلصت المعلومات وثيقة الصلة بموضوع الدراسة وأجري عليها إحصاء وصفي وتحليلي. لإيجاد العلاقة بين المتغيرات بخصوص نتائج التنظير، تم إجراء اختبار فيشر باستخدام برنامج الحزمة الاحصائية للعلوم الاجتماعية (SPSS) إصدار 17 مع اعتبار قيمة p اقل من 0.05 للدلالة إحصائية.

النتائج: تم تقييم 350 تقريراً للتنظير الداخلي للجهاز الهضمي العلوي شملت 229 ذكر و121 أنثى، تراوحت أعمارهم بين 2-100 عاماً. كان الداعي الأكثر شيوعاً لإجراء تنظير الجهاز الهضمي العلوي هو آلام الشرسوفي، إذ كان العدد الإجمالي للمرضى الذين ظهر عليهم هذا العَرَض هو 146 مريضاً منهم 81 ذكر و65 أنثى. وقد كان التهاب المعدة هو نتيجة التنظير الأكثر شيوعاً (العدد الاجمالي 143 مريض منهم 76 ذكر و67 انثى)، وكان التدخل بالتنظير الداخلي الأكثر شيوعاً هو ربط دوالي المريء بشريط مطاطي مرن لعدد 51 مريض. إن 8.6% من إجمالي فحوصات التنظير الداخلي أجريت لمرضى السرطان في مراحل وأجزاء مختلفة من الجهاز الهضمي العلوي. كذلك كشفت الدراسة عن وجود علاقة ذات دلالة احصائية بين متغير العمر وسرطان المعدة لدى المرضى الذين يعانون من آلام الشرسوفي $p<0.001$

الاستنتاج: آلام الشرسوف كان أكثر دواعي إجراء التنظير الداخلي للجهاز الهضمي العلوي والتهاب المعدة كان أكثر الأمراض المكتشفة. يجب أخذ الحذر من آلام الشرسوف لدى المرضى ذوو الفئة العمرية المتقدمة وإجراء التنظير الداخلي للجهاز الهضمي العلوي لاستقصاء سرطان المعدة. الدراسة سلطت الضوء على أهمية التنظير الداخلي التشخيصي والعلاجي للجهاز الهضمي العلوي لدى المرضى اليمنيين.

الكلمات المفتاحية: التنظير الداخلي للجهاز الهضمي العلوي، تدخلات التنظير الداخلي، سرطان المعدة.

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Introduction

Upper gastrointestinal tract (UGIT) disorder is one of the most commonly encountered problems in clinical practice. There is a wide range of pathological lesions and disorders which can affect UGIT and need proper investigation to reach diagnosis [1]. Evidently, upper gastrointestinal endoscopy (UGIE) or Esophago-gastroduodenoscopy (EGD) is a technique that visually examines the lining of the UGIT with the aid of an endoscope- a small, flexible camera with light [2]. It can be regarded as the gold standard investigation which greatly facilitates the evaluation of patients with upper gastrointestinal (UGI) symptoms [3]. The pathology underlying UGI symptoms vary and may be associated with significant morbidity and mortality [4]. During endoscopy, if biopsy is required; then it can be taken and tissue diagnosis can be successfully done from sites that were previously inaccessible without major resection [5,6]. Endoscopic biopsy not only used to diagnose disease but also used for monitoring the course, extent of disease, response of the therapy, and early detection of complications. This is reflected by rising trend in obtaining mucosal biopsies from UGIT [7].

The continuous development of gastrointestinal endoscopic devices in response to the requirement for more detailed images has recently resulted in the advancement of previous devices with limited capacity to flexible, physician friendly and computerized equipment [8]. The use of EGD does not limit to diagnostic purposes only, but it is carried out for therapeutic interventions with increasing order of frequency and expanding spectrum of implications. Various procedures like variceal band ligation, sclerotherapy, polypectomy, biopsy and hemostasis of bleeders can be achieved [9]. It has indeed become a cost effective and reliable tool to modern surgery as it is a minimally invasive procedure [9]. It can be performed with a reasonable degree of competence and safety even in a resource-limited environment [10]. Serious complications rarely occur from UGIE [11].

During the last 10 years, 22 May Hospital was one of the two recognized public referral hospitals in Aden, which provided endoscopic services. However, there are few published researches in Aden, in the field of UGIE, which raise the need to take the initiative to carry out this research. Therefore, this study aimed to describe the clinical presentation of patients, endoscopic findings and interventions carried out in 22 May Hospital during 2018. It aimed also to analyze the endoscopic findings of the most common clinical presentation.

Methods

A retrospective study of upper UGIE was carried out in 22 May hospital during 2018. All available electronic reports of endoscopies during the study period, without age, or gender restriction were enrolled in this study. Patients underwent endoscopic retrograde cholaniopancreatogarphy (ERCP) with side viewing endoscope were excluded from this study. Relevant data were extracted.

Descriptive and analytic statistics were performed. Categorical variables are expressed as counts and percentages. To find out the association between variables in regards to endoscopic findings, Fisher's exact test was carried out with the statistical package for social science SPSS version 17. Having a *p*-value of <0.05 was considered statistically significant.

Endoscopies were performed by experts (two medical endoscopist and two consultant surgeon). Intravenous sedation with Midazolam and/or propofol) was applied. If a patient refuse sedation; local lidocaine pharyngeal spray was used. The Device used was Olympus Exera II CV-180. Written informed consent was obtained from all patients, or parents before endoscopy.

Results

A total of 350 EGD reports were collected and analyzed. As shown in Table 1, there were 65.4% males and 34.6% females. The median age was 45 and the mean age was 44.2 years with a standard deviation (SD)=17.1 years which ranged from 2 to 100 years.

Table1: Socio-Demographic Characteristics of the Sample (n=350)

Characteristic	No.	%
Gender		
Male	229	65.4
Female	121	34.6
Age (years)		
≤10	3	0.9
11- 20	26	7.4
21- 30	59	16.9
31- 40	76	21.7
41-50	56	16.0
51-60	69	19.7
61- 70	48	13.7
≥ 71	13	3.7
Mean age ± SD (years)	44.2 ± 17.1	

Indication(s) for UGIE are shown in Table 2. The most common indication was epigastric pain (41.7%) found in 146 cases consist of 81 males (53.7%) and 65 females (35.3%). The next three common indications for EGD were chronic liver disease (13.7%), dysphagia (11.4%), and heamatemesis (11.1%).

Table 2: Indications for UGIE, 22 May Hospital, Aden, 2018.

Indication(s)[1] for EGD	Male	Female	Total[2]	%[3]
epigastric pain	81	65	146	41.7
Chronic liver disease	39	9	48	13.7
Dysphagia	31	9	40	11.4
Hematemesis	32	7	39	11.1
Vomiting	17	21	38	10.9
Dyspepsia	8	14	22	6.3
heart burn	8	11	19	5.4
Loss of weight	9	6	15	4.3
Anemia	12	2	14	4.0
Jaundice	5	0	5	1.4
Bloating	3	1	4	1.1
Nausea	3	1	4	1.1
Bleeding per rectum	3	1	4	1.1
Diarrhea	0	3	3	0.9
Mouth ulcer	2	1	3	0.9
epigastric mass	2	0	2	0.8
Foreign body swallow	1	1	2	0.8
Regurgitation	1	0	1	0.3
Corrosive swallow	1	0	1	0.3
Other	6	2	8	2.3
Indication(s)[1] count	**Male**	**Female**	**Total[2]**	**%[3]**
1 indication	200	91	291	83.1
2 indications	23	27	50	14.3
≥ 3 indications	6	3	9	2.6
Total	229	121	350	100

[1] *Indication(s): not restricted to single indication per case.*
[2] *Total = male + female in same row*
[3] *Percent was calculated from total number of endoscopies (n= 350)*

Table 3 illustrates the findings of EGD. The most common EGD finding was gastritis in both genders (40.9%). The 2nd most common EGD finding was gastroesophageal reflux disease (GERD) (26%) whereas the 3rd most common finding was esophageal varices combined with gastroesophageal varices (21.7%). The diagnostic yield of EGDs in the study population was 95.7%.

Duodenal ulcer as well as duodenitis were found more frequently among males compared to females, with a ratio of 18:1 and 9:1 respectively. Fifty-six patients (16%) had esophageal varices and another 20 patients (5.7%) had gastroesophageal varices. Among them 37 patients had associated portal hypertensive gastropathy (PHG).

Table 4 illustrates that one third of patients who presented with epigastric pain and were older than 65 years, had gastric cancer. It also reveals the existence of statistical association between age and gastric cancer among patients with epigastric pain (p <0.001).

Endoscopic interventions were performed for diagnostic as well as therapeutic purposes. Diagnostic endoscopy procedures performed during the study period included biopsies for histopathology in 50 cases (14.3%) and biopsies for *H.pylori* in 70 cases (20%).

Rapid urease slide tests were performed on the samples taken during endoscopic procedure in 70 patients (38 males and 32 females) and revealed positive results in 40 patients (57%), 21 males and 19 females respectively.

Table 3: Results of UGIE, 22 May Hospital, Aden, 2018.

Endoscopic findings[1]	**Male**	**Female**	**Total[2]**	**%[3]**
Gastritis	76	67	143	40.9
GERD	54	37	91	26.0
Esophageal varices	46	10	56	16.0
Incompetent LES	36	9	35	12.9
PHG	32	5	37	10.6
Esophagitis	12	10	22	6.3
Gastric cancer	14	8	22	6.3
Gastroesophageal varices	15	5	20	5.7
Hiatal hernia	12	7	19	5.4
Duodenal ulcer	18	1	19	5.4
Gastric ulcer	13	4	17	4.9
Normal	7	8	15	4.3
Bile reflux	4	8	12	3.4
Duodenitis	9	1	10	2.9
Esophageal stricture	9	1	10	2.9
Gastric outlet obstruction	7	2	9	2.6
Gastroduodenitis	8	1	9	2.6
Esophageal cancer	4	2	6	1.7
Esophageal candidias	4	1	5	1.4
Duodenal tumor	3	0	3	0.9
Duodenal diverticulum	3	0	3	0.9
Gastric polyp	2	0	2	0.6
Water melon stomach	1	1	2	0.57
Other	10	7	17	4.9
Endoscopic findings[1] count	**Male**	**Female**	**Total[2]**	**%[3]**
1 finding	85	49	134	38.3
2 findings	106	54	160	45.7
≥ 3 findings	31	10	41	11.7
Normal findings	7	8	15	4.3
Total	229	121	350	100

[1] Endoscopic finding(s): not restricted to single finding per case. [2]Total= male + female in same row.
[3] Percent (%) calculated from total number of endoscopies (n=350).
GERD: Gastroesophageal reflux disease, LES: Lower esophageal sphincter, PHG: portal hypertensive gastropathy.

Table 4: Endoscopic Findings among Patients with Epigastric Pain (n=146) in Relation to Gender and Age Groups, in 22 May Hospital, Aden, 2018

EGD findings:	Gender			Age (years)				Total* (%#)
	Male (%*)	Female (%*)	*p*-value	< 40 (%#)	40 – 65 (%#)	> 65 (%#)	*p*-value	
Gastritis	22 (45.8)	26 (54.2)	0.113	27 (42.9)	17 (25.0)	4 (26.7)	0.092	48 (32.9)
Gastritis + GERD	21 (61.8)	13 (38.2)	0.436	10 (15.8)	23 (47.1)	1 (6.7)	**0.014**	34 (23.3)
GERD +/- hiatal hernia	8 (50)	8 (50)	0.791	8 (12.7)	6 (8.8)	2 (13.3)	0.681	16 (11.0)
Duodenal ulcer	8 (88.9)	1 (11.1)	**0.043**	2 (3.2)	7 (10.3)	0 (0)	0.185	9 (6.2)
Gastric cancer	5 (62.5)	3 (37.5)	0.733	0 (0)	3 (4.4)	5 (33.3)	**<0.001**	8 (5.2)
Normal	1 (12.5)	7 (87.5)	**0.022**	5 (7.9)	3 (4.4)	0 (0)	0.565	8 (5.5)
Gastric ulcer	4 (57.1)	3 (42.9)	1.000	3 (4.8)	3 (4.4)	1 (6.7)	0.867	7 (4.8)
Gastritis + esophagitis	4 (66.7)	2 (33.3)	0.693	3 (4.8)	2 (2.9)	1 (6.7)	0.584	6 (4.1)
Barret's esophagus	3 (100)	0 (0)	0.254	0 (0)	2 (2.9)	1 (6.7)	0.153	3 (2.1)
Other	5 (71.4)	2 (28.6)	0.462	5 (7.9)	2 (2.9)	0 (0)	0.354	7 (4.8)
Total #	81# (55.5)	65# (45.5)	–	63# (100)	68# (100)	15# (100)	–	146# (100)

Total: total of row, Total#: total of column.*
GERD: Gastroesophageal reflux disease, + : associated with, +/- : with or without

Therapeutic endoscopic procedures performed during the study period included esophageal varices rubber band ligation in 51 cases (51.7%), sclerotherapy using histoacryl in 3 cases (4%) for gastric varices and additional two cases (3%) had combined rubber band ligation and sclerotherapy in the same endoscopic procedure. Balloon dilatation of esophageal stricture done in 9 cases (12%), and at anastomotic site (esophagogastrostomy) in 2 cases (3%). Foreign body was removed in 2 cases (3%), (battery, food stuff) as shown in Figure 1.

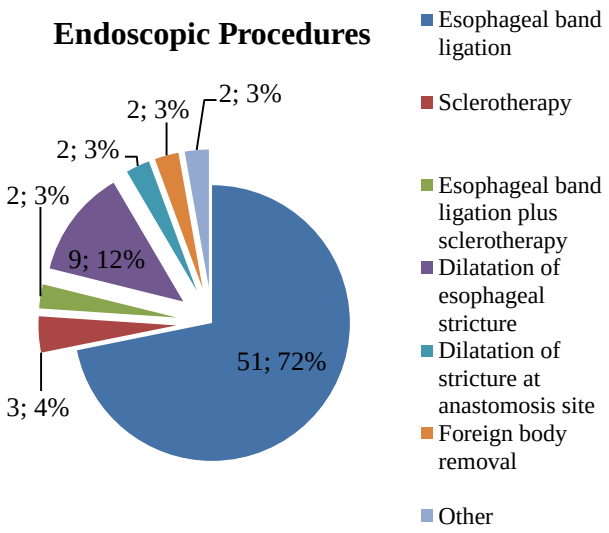

Figure 1: Therapeutic Endoscopic Procedures, 22 May Hospital, Aden, 2018

Discussion

The current study found male preponderance, which is similar to what Padma and Murugan (2018) reported in rural areas of Tiruchirappalli district, India of male and female distribution of 61.8% and 38.2% respectively [12]. Similarly, Patel and Vaishnav (2016) and Khan *et al* (2013) reported male and female percentages of 58% vs. 42% and 70% vs. 30% respectively [6,13]. This may be because UGI diseases are more prevalent in males [14]. However, Picardo and Ajayi in Nigeria (2015) found a male to female ratio of approximately 1:1 among patients who had EGD, signifying equal male to female opportunities for EGD [15]. On the other hand, the mean age was 44.2±17.1 years. This is comparable with figures mentioned by Ageely in Gizan [11], Jeje *et al* in Lagos [14] and Kamdem *et al* in Cameroon [16] where the mean patient age was 45.3 42.2, and 47.6 years respectively.

There are multiple reasons patients present for UGIE. Khan *et al* [13] noticed dyspepsia (61%), being commonest indication for UGIE, whereas Olokoba *et al* (2010) found dyspepsia (45.6%), UGI bleeding (26.2%) and gastric outlet obstruction (5.8%) the most common indications for EGD [17]. In the present study, epigastric pain (40.3%) was the most common indication for EGD. This is consistent with what was reported in Nigeria by Ismaila [10] and Misauno, and in South-western Uganda [18] by Obayo *et al*, that abdominal pain was the most common indication for UGIE. Such findings are different from the findings by Ageely in Gizan, reported UGI bleeding as the most common indication for upper UGIE (23.3%) followed by epigastric pain (15.7%) [11].
On the other hand, in a cross-sectional study in northern Tanzania, Ayana *et al* (2014) identified gastritis as the most common endoscopic findings at 61.1% [19]. Likewise, gastritis is the most common endoscopic finding in the present study (40.9%), similar to a study by Bulur *et al* in Mogadishu- Somalia where gastritis accounted for 44.1% of the EGD findings [20].

In this study, GERD was found in 26% of patients, representing the second most common EGD finding. Ray *et al* in India (2016) found 6% of patients had reflux esophagitis [9], whereas Al-Humayed *et al* in Saudi Arabia (2010) reported GERD in 15% of patients [4].

In this series, esophageal varices together with gastroesophageal varices represented the third most common EGD findings (21.7%). Padma and Murugan have reported esophageal varices as the third most common endoscopic findings at 8.9% in 2198 patient [12]. On the other hand, there were one case (0.3%) of hypopharyngeal carcinoma, 1.7% with esophageal cancer, (6.3%) with gastric cancer and (0.3%) with duodenal cancer. Therefore, this study revealed that (8.6%) of all endoscopic examinations were performed in malignancies with different sites and stages which is in accordance with Celebi *et al*, in a single center experience (6%) [8]. The present study showed similar percentage of esophageal cancer (1.7%) but higher percentage of gastric cancer (6.3%) in comparison to a single center

study in Netherland (2012) by Loffeld *et al*. (1.3% esophageal cancer and 1.1% gastric cancer respectively) [21]. However, Hamrah *et al* (2014) in Northern part of Afghanistan found much higher rate of esophageal cancer (25.3%) but lower rate of gastric cancer (3.6%) in comparison to our study [22]. Kunar *et al*. (2017) in Bhubaneswar found gastric cancer in 7.5% of patients [3]. Another study by Ainapure *et al* (2018) in Karnatka, India, found esophageal cancer and gastric cancer in 2.2% and 3.1% of patients respectively [23], whereas Javali *et al (*2015) found the incidence of carcinoma of esophagus and carcinoma of stomach almost equal; 4.5% and 4.6% respectively [24].

Regarding diagnostic yield of EGD, Patel and Vaishnav (2016) reported 81% positive findings in 154 patients [6]. The present study detected 95.7% positive findings in 350 patients, near to the findings of Celebi *et al*. (96.7%) [8]. Lower figures were provided by Ageely (78.7% positive findings) [11]. In the present study, high diagnostic yield of EGD was probably because the study hospital is a referral hospital and receives selective cases from different governorates.

Regarding *H. pylori* infection, Al-Makdad *et al*. (2013) reported 98.7% prevalence in 2300 Yemeni patients [25], which is significantly higher than the finding in the present study (57%). This could be due to the small sample in our study or might be due to changing disease pattern. In this regards, different figures of positive *H. pylori* infection were reported from gastric biopsies at 82% in Jordan [26], 46.5% in Jazan province in Saudi Arabia [27] and 30.1% in Oman [28].

Conclusion

The present findings indicate that epigastric pain was the main indication for UGIE and gastritis was the most commonly observed disease. Epigastric pain should be taken cautiously among patients with advancing age, and need endoscopic evaluation to rule out gastric cancer. The study highlighted the importance of the diagnostic and interventional use of UGIE in Yemeni patients.

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References

1. Memon F, Baloch K, Memon A. Upper gastrointestinal endoscopic biopsy; morphological spectrum of lesions. Professional Med J 2015; 22(12): 1574 -79.
2. Shah JV, Shah S. Upper gastrointestinal endoscopy in early diagnosis of gastric disorders. IJCMR 2016; 3(7): 1943-45.
3. Kunar BM, Pani J, Kanungo GN, Mondal R. Role of upper g.i endoscopy in the management of benign and malignant condition of stomach. Indian J of Applied Research 2017; 7 (6):34-5.
4. Al-Humayed SM, Mohammed-Elbagir AK, AlWabel AA, Argobi

YA. The changing pattern of upper gastrointestinal lesions in Southern Saudi Arabia, an endoscopic study. Saudi J Gastroenterol 2010;16(1):35-7.
5. Hirachand S, Sthapit RR, Gurung P, Pradhanang S, Thapa R, Sedhai M, *et al*. Histopathological spectrum of upper gastrointestinal endoscopic biopsies. JBPKIHS 2018;1(1):67-8.
6. Patel HS, Vaishnav U. Analysis of upper gastrointestinal scopy finding in public hospital associated with medical college. Int Surg J 2016;3(4):1964-66.
7. Krishnappa R, Horakerappa MS, Mangala AK, Mangala G. A study on histopathologic spectrum of upper gastrointestinal tract endoscopic biopsies. Int J Medical Res Health Sciences 2013; 2(3): 418-24.
8. Celebi A, Akdemir F, Gurler M, Koc DO, Ozdemir A, Ekizoglu I, *et al*. A retrospective analysis of esophagogastroduodenoscopies: a single center experience. J Gastrointest Dig Syst 2017; 7:4.
9. Ray S, Patel H, Kotecha J, Parmar H. Analytical study of upper gastrointestinal endoscopy - 200 cases. IAIM 2016; 3(9): 98-102.
10. Ismaila BO, Misauno MA. Gastrointestinal endoscopy in Nigeria - a prospective two-year audit. Pan African Medical J 2013; 14:22. Available from: http://www.panafrican-med-journal.com/content /article /14 /22/full/.
11. Ageely H. Indications and findings of upper gastrointestinal endoscopy (UGIE) in patients of Gizan, Saudi Arabia: A retrospective study. Middle East J Family Med 2015;13(8):4-11.
12. Padma S, Murugan R. Disease pattern by upper gastrointestinal endoscopy in rural areas of Tiruchirappalli district carried out at CMCH and RC Irungalur, retrospective study and comparative analysis with other contemporary studies in India. Int Surg J 2018; 5(3):965-70.
13. Khan N, Shabbir G, Zarif M, Khattak MI. Upper gastrointestinal endoscopic assessment of patients presenting with dyspepsia. J Postgraduate Medical Institute 2011; 21(3): 212-6.
14. Jeje E, Olajide T, Akande B. Upper gastrointestinal endoscopy - our findings, our experience in lagoon hospital, lagos, nigeria. macedonian j medical sciences 2013;6(2):168-73.
15. Picardo NG, Ajayi NA. Indications for an endoscopic finding in patients with symptoms of upper gastrointestinal disease in a Tertiary Hospital in South-Eastern Nigeria. African J Medical Health Sciences 2015;14(2): 96-100.
16. Kamdem J, Palmer D, Barrier C, Bardin R, Brown JA, Topazian M. Diagnostic yield of gastrointestinal endoscopy in North West Region Cameroon and trends in diagnosis over time. Pan Afr Med J 2018; 29: 178.
17. Olokoba AB, Bojuwoye BJ. Indications for oesophagogastroduodenoscopy in Ilorin, Nigeria- a 30-month review. Nigerian J Clinical Practice 2010; 13(3):260-3.
18. Obayo S, Muzoora S, Ocama P, Cooney MM, Wilson T, Probert CS. Upper gastrointestinal diseases in patients for endoscopy in South-Western Uganda. Afri Health Sci 2015;15(3):959-66.
19. Ayana SM, Swai B, Maro VP, Kibiki GS. Upper gastrointestinal

endoscopic findings and prevalence of Helicobacter pylori infection among adult patients with dyspepsia in northern Tanzania. Tanzan J Health Res 2014;16(1):16-22. https://www.ncbi.nlm.nih.gov/pubmed/26867268, accessed 15 November 2019.

20. Bulur O, Bas Y, Abdi OA, Dal K, Ertugrul DT, Unsal O. The only and first analysis of upper gastrointestinal endoscopy results from Mogadishu- Somalia. Turkiye Klinikleri J Cardiovasc Sci 2018;30(1):1-5.
21. Loffeld RJLF, Liberov B, Dekkers PEP. The changing prevalence of upper gastrointestinal endoscopic diagnoses: a single-centre study. Netherlands J Medicine 2012; 70(5): 222-6.
22. Hamrah MS, Hamrah MH, Rabi M, Wu HX, Hao C, Harun-Or-Rashid M, *et al*. Prevalence of esophageal cancer in the northern part of afghanistan. Asian Pac J Cancer Prev 2014; 15 (24): 10981-4.
23. Ainapure R, Tanga V. A clinico-endoscopic study of upper GI disorders in rural population. Int Surg J 2018; 5(3):1111-3.
24. Javali S, Madan M, Harendrakumar ML, Mahesh MS. Role of endoscopy in evaluating uppergastrointestinal tract lesions in rural population. J Digestive Endoscopy 2015; 6(2):59-65.
25. Al-Makdad AM, Al-Dholaee MH, Thabet AAK, Al-Haimi MA, Balfaqih OS, Al-Hadad AM. Prevalence of Helicobacter Pylori Infection in Yemeni Patients. YJMS 2013; 7(1):33-8.
26. Bani-Hani KE, Hammouri SM. Prevalence of Helicobacter pylori in Northern Jordan. Endoscopy based study. Saudi Med J 2001; 22(10): 843-7.
27. Akeel M, Elmakki E, Shehata A, Elhafey A, Aboshouk T, Ageely H, *et al*. Prevalence and factors associated with H. pylori infection in Saudi patients with dyspepsia. Electronic Physician 2018; 10(9): 7279-86.
28. Alwahaibi NY, Almahrooqi BM, Alrawahi SA. The prevalence of Helicobacter pylori and gastritis in Oman. J Digestive Endoscopy 2013;4(2):29-32.