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IMPACT OF COVID-19 PANDEMIC ON GASTROINTESTINAL ENDOSCOPY SERVICES AT A TERTIARY HOSPITAL IN SOUTH-WEST NIGERIA.

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Abstract— **Background and Aim:** The Corona virus disease (COVID-19) pandemic has affected healthcare service delivery globally including gastrointestinal endoscopy procedures. This study investigated the impact of COVID-19 on Gastrointestinal Endoscopy services at the Federal Teaching Hospital, Ido-Ekiti, Nigeria. **Methods:** This was a retrospective cohort study of all Upper Gastrointestinal Endoscopies (UGIE) and Lower Gastrointestinal Endoscopies (LGIE) performed between February 2016 and February 2021 (a period of 5 years). The Age, Gender, Procedure type and Number of procedures performed were obtained from the endoscopy register. A total of 208 UGIE and a total of 48 LGIE had been performed over the period. The data obtained was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0. Descriptive statistics used included frequency tables, charts, means and standard deviations. **Results:** A total number of 208 upper gastrointestinal endoscopies were performed during the period under review, out of which 109 (52.4%) were males and 99 (47.6%) were females with a male to female ratio of 1.1 to 1. The age range of the patients was 9 to 89 years with a mean(±SD) of 52.4(±16.8) years and median of 52.5 years. Furthermore, a total number of 48 lower gastrointestinal endoscopies were performed during the period under review, out of which 34 (70.8%) were males and 14 (29.2%) were females with a male to female ratio of 2.4 to 1. The age range of the patients was 35 to 86 years with a mean(±SD) of 61.7(±14.03) and median of 62.5 years. There had been a gradual rise over the years in the number of the UGIE performed, with 34 (16.3%) procedures in 2016 to 57 (27.4%) procedures in 2019 but declined to 31 (14.9%) procedures in 2020 following the COVID-19 pandemic. There had also been a gradual rise over the years in the number of the LGIE performed, with 5 (10.4%) procedures in 2016 to 15 (31.2%) procedures in 2019 but declined to 14 (29.2%) procedures in 2020 also as a result of the pandemic. **Conclusion**: The COVID-19 pandemic impacted negatively on the volume of the upper and lower gastrointestinal endoscopy procedures performed. There is a need for all stakeholders to ensure that the pandemic is brought to an end.

Key words: COVID-19, Impact, Gastrointestinal Endoscopy, Nigeria.

1. Introduction

Coronavirus disease 2019 (COVID-19) is caused by a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China.[1] It was initially reported by the World Health Organization (WHO) in December 2019 and by March 2020, the WHO had declared COVID-19 a global pandemic.[2]

The virus is thought to spread mainly from person to person through respiratory droplets produced when an infected person coughs, sneezes, or talks.[3] The virus can also be spread through invasive medical procedures such as gastrointestinal endoscopy.[4,5] Some people who are infected may not have symptoms. For people who have symptoms, illness can range from mild to severe. Adults 65 years and older and people of any age with underlying medical conditions are at higher risk for severe illness.[2,3]

According to the World Health Organization (WHO), there are currently over 254 million confirmed cases globally with more than 5 million deaths.[2] The Nigerian Centre for Disease Control (NCDC) have currently reported more than 213,000 confirmed cases in the country so far and almost 3,000 deaths.[6]

Medical institutions all over the world have been challenged not only with the influx of large numbers of severely ill patients from COVID-19 but also with infection prevention and control of the spread of the disease as well as restructuring and reorganization of medical practice to accommodate patients with other medical or surgical problems.[2,3]

As with all other fields of medical practice, the COVID-19 pandemic has impacted gastrointestinal endoscopy services, especially with regards to the volume of elective procedures being performed, cleaning and disinfection of endoscopy equipment, triage and prioritization of patients and procedures, as well as protection of health care workers from contracting the virus.[7-10]

Gastrointestinal endoscopy centers are specialized units where several endoscopies are performed annually. Gastrointestinal (GI) endoscopy procedures include Diagnostic and Therapeutic Upper and Lower GI Endoscopies, Endoscopic Retrograde Cholangiopancreatography and Endoscopic ultrasonography.[11,12] A significant proportion of these procedures are affected due to the national and regional lockdowns across the globe as a result of the COVID-19 pandemic. Endoscopy procedures are also restricted in most institutions globally because endoscopy procedures could add to the disease transmission as SARS-CoV-2 has been shown to be present in GI secretions.[4,5]

The aim of this study is to determine the impact of the COVID-19 pandemic on endoscopy services at the Federal Teaching Hospital, Ido-Ekiti, Ekiti State in south-west Nigeria. The institution started offering gastrointestinal endoscopy services in February 2016 till date.[13,14] The findings from this study will provide an insight to how the COVID-19 pandemic has affected endoscopy service delivery in the institution and the knowledge of this can help to guide the formulation of policies that would mitigate the effect of the pandemic and improve endoscopy service delivery in the institution.

2. Methodology

2.1 Study design

This was a retrospective cohort study of the upper and lower gastrointestinal endoscopy procedures performed between February 2016 and February 2021 (a period of 5 years) at the Federal Teaching Hospital, Ido-Ekiti, Ekiti state in south-west Nigeria.

2.2 Study location

The study was conducted at the Federal Teaching Hospital, Ido-Ekiti, Ekiti state in south-west Nigeria. Ido-Ekiti is one of the rural communities located in Ido-Osi local government area of Ekiti state which has an estimated population of 159,114 people. The Federal Teaching Hospital, Ido-Ekiti is a tertiary health institution that started providing endoscopy services for patients since February 2016 till date.

The endoscopy procedures were carried out in the endoscopy suite which is located within the Operating Theatre complex of the Federal Teaching Hospital, Ido-Ekiti. The Gastroenterology unit of the Department of Medicine is in charge of all gastrointestinal endoscopies in the institution.

2.3 Patient population

Referrals for endoscopies are received by the Gastroenterology unit from the hospital's outpatient clinics, wards, emergency department, other various specialized units within medicine department as well as from

other departments in the hospital such as Paediatrics, Obstetrics and Gynaecology, and General Surgery. Referrals are also received from private and public health institutions in Ekiti State and the nearby states. The hospital runs an "open access" endoscopy policy whereby the patients are directly referred to the endoscopy room by their physicians based on their perceived need without prior review by a gastroenterologist. Nevertheless, the patients would be properly prepared for the procedure following standard protocols.

2.4 Procedure

Patients presenting for upper gastrointestinal endoscopy would have been booked and fasted for a minimum of 8hours before the procedure while patients presenting for lower gastrointestinal endoscopy would have also been booked and undergone adequate bowel preparation which usually commences 3 days before the procedure and were also fasted for a minimum of 8hours before the procedure. The procedure was explained to them and a written informed consent obtained before the procedure. The patients' socio-demographics, type of endoscopy and indication for the endoscopy were documented in the endoscopy register.

The usual standard universal precautions were followed for the procedures but following the emergence of the COVID-19 pandemic, infection control protocols for COVID-19 were followed and the use of personal protective equipment (PPE) became mandatory for the endoscopy staff. Pre-procedure temperature checks and rapid diagnostic test for COVID-19 were instituted.

Patients were placed in the left lateral decubitus position. A systematic examination of the gastrointestinal tract was done by the endoscopist (a Gastroenterologist). The endoscopy procedures were done using a forward viewing Olympus CV-170 series video scope (Olympus America Incorporated) according to standard procedures. Endoscopic images of important views were taken for documentation and for further review after the procedure. Samples of mucosal biopsies were taken as indicated. There was observation of the patient for a minimum period of 30minutes after the procedure and subsequently discharged home or taken to the wards once the vital signs are satisfactory.

2.5 Data collection

The endoscopy room register was used to obtain the data for a five-year period; February 2016 to February 2021. The following information were obtained from the register: Age, Gender, Procedure type and Number of procedures performed. A total of 208 upper gastrointestinal endoscopies and 48 lower gastrointestinal endoscopies had been performed over this period.

2.6 Data Analysis

The data obtained was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0 computer software package (SPSS Chicago Inc. IL U.S.A). Descriptive statistics used included frequency tables, charts, means and standard deviations.

3. Results

A total number of 208 upper gastrointestinal endoscopies were performed during the period under review (February 2016 to February 2021 – a five year period), out of which 109 (52.4%) were males and 99 (47.6%) were females with a male to female ratio of 1.1 to 1 (Figure 1). The age range of the patients was 9 to 89 years with a mean(±SD) of 52.4(±16.8) and median of 52.5 years (Figure 2). The highest number of upper gastrointestinal endoscopies were performed on individuals within the age bracket of 50-59 years whom were mostly females (Table 1).

In addition, a total number of 48 lower gastrointestinal endoscopies were performed during the period under review (February 2016 to February 2021 – a five year period), out of which 34 (70.8%) were males and 14

(29.2%) were females with a male to female ratio of 2.4 to 1 (Figure 3). The age range of the patients was 35 to 86 years with a mean(±SD) of 61.7(±14.03) and median of 62.5 years (Figure 4). The highest number of lower gastrointestinal endoscopies were performed on male individuals above 60 years of age (Table 2).

There had been a gradual rise over the years in the number of the upper gastrointestinal endoscopies performed with 34(16.3%) procedures performed in 2016, 57 (27.4%) procedures in 2019 but declined to 31 (14.9%) procedures in 2020 (Figure 5). There had also been a gradual rise over the years in the number of lower gastrointestinal endoscopies performed with 5(10.4%) procedures performed in 2016, 15 (31.2%) procedures in 2019 but declined to 14 (29.2%) procedures in 2020 (Figure 6).

4. Discussion

In this study, the total number of the upper and lower gastrointestinal endoscopy procedures performed over the 5-year period was quite small when compared with similar studies in Nigeria.[15-20] This could be due to a number of reasons which include the fact that the hospital is located in a rural environment which has a small population compared to an urban community, the low socio-economic status of the residents, poor access to health insurance and preference of traditional remedies to orthodox treatment. These factors could have contributed to the low procedure volume recorded in this study.

There was an initial increase in the number of upper gastrointestinal endoscopies performed from 34(16.3%) in 2016 to 57(27.4%) in 2019, this trend changed in 2020 with only 31 (14.9%) procedures performed in that year. A similar trend was also observed in the number of lower gastrointestinal endoscopy procedures performed which initially increased from 5(10.4%) in 2016 to 15(31.2%) in 2019 but declined to 14(29.2%) in 2020. The period of these decline coincided with the period when the COVID-19 pandemic was ravaging, affecting delivery of various healthcare services including endoscopy services. There were also periods of nationwide lockdown and restriction of movement in 2020 affecting access of patients to the hospital for healthcare services including endoscopy services. More endoscopy procedures would have been recorded in 2020 than that of 2019 going by the upward trend in the number procedures performed at the institution before the pandemic.

Ebigbo *et al*[7] in a study on the impact of the COVID-19 pandemic on gastrointestinal endoscopy in Africa in which 31 Gastroenterologists from 14 countries in north, central, and sub-Saharan Africa responded to the survey. The majority of the respondents reported a considerable reduction in the volume of endoscopy procedures performed as a result of the COVID-19 pandemic.

Similarly, Alboraie *et al*[8] in an international survey of endoscopists from 48 countries around the world on the global impact of COVID-19 on gastrointestinal endoscopy units reported that majority had a reduction in the volume of endoscopy procedures by more than 50%.

Also, Perisetti *et al*[9] reported a significant reduction in the number of gastrointestinal endoscopy procedures performed in the United States as a result of the COVID-19 pandemic. In addition, they also reported that many endoscopy centres have made significant modifications in their respective institutions as a result of the pandemic, and these include changes in endoscopy suite structure, changes in staffing, changes in endoscopy indications and triaging, changes in cleaning and disinfection of endoscopes, use of personal protective equipment, mandatory pre-procedural testing and changes in infection control policies.

Siau *et al*[21] in the United Kingdom reported that endoscopy trainees' involvement in gastrointestinal endoscopy procedures have been affected significantly during the pandemic. This will have a negative impact on the quality of training and skill acquisition of the endoscopy trainees.

Furthermore, Chiriac *et al*[10] in Romania reported a 6.2fold decrease in the number of gastrointestinal procedures performed in their institution as a result of the COVID-19 pandemic. Furthermore, they also reported a reduction in the number of screening colonoscopies being performed which as led to a decrease in the colon cancer detection rate in their facility. The negative implication of this is that patients will be presenting later-on with advanced colorectal tumours due to failure to detect the cancers early.

Colorectal cancer detection rates have declined significantly in many endoscopy centres globally as a result of the reduction in the number of elective and surveillance endoscopies being performed due to the pandemic. This is a major negative impact of the COVID-19 pandemic on endoscopy practice; the reality which endoscopists across the globe have to face.[22] Increase in the incidence of advanced gastrointestinal tumours should be expected and this will increase the morbidity and mortality associated with such tumors and will also put a major strain on the limited healthcare resources available particularly in the developing countries.

No doubt the COVID-19 pandemic has affected endoscopy units throughout the world and the global health crisis is still far from over. Endoscopy services cannot be continuously restricted even though it is an invasive procedure with a high risk of transmission of the SARS-CoV-2 virus. Appropriate measures can still be instituted to safely resume elective endoscopy procedures. Various endoscopy units are currently working to resume the elective gastrointestinal endoscopies that have been delayed as a result of the COVID-19 imposed restrictions. This is a difficult but necessary process as the worldwide dramatic reduction in the number of endoscopy procedures puts patients at risk by potentially delaying the diagnosis of gastrointestinal cancers. Proper diagnostic endoscopic evaluation of patients can then be carried out and therapeutic interventions instituted as indicated.

Several national and international endoscopy societies such as, the World Endoscopy Organization (WEO), the American Society for Gastrointestinal Endoscopy (ASGE) and the European Society of Gastrointestinal Endoscopy (ESGE) among others have published updated guidelines and recommendations regarding performing gastrointestinal endoscopies in a pandemic era.[4,5,23] These guidelines and recommendations can be suitably adapted for use in our respective endoscopy units.

Conclusion and Recommendations

The total number of the endoscopy procedures performed over the five-year period under review in this study is quite low when compared with similar studies in the country. The number of the procedures performed in year 2020 declined as a result of the impact of the COVID-19 pandemic on endoscopy service delivery. A similar trend of decline in the volume of endoscopy procedures have been reported by various health institutions offering gastrointestinal endoscopy services across the globe.

The importance of gastrointestinal endoscopy in the evaluation and management of patients with upper and lower gastrointestinal symptoms cannot be overemphasized. Healthcare services including endoscopy services should not be allowed to be negatively impacted. There is a need for the government, international community, various health organizations, donor agencies and all relevant stakeholders to continue to be even more committed towards bringing this pandemic to an end.

Aggressive public enlightenment campaigns, preventive measures such as use of face masks and hand hygiene, provision of readily accessible testing facilities, development of efficacious vaccines and vaccination of the general public, provision of personal protective equipment for at risk healthcare workers and other workers and the on-going development of potent drugs that can achieve cure are among the

measures that have so far brought the COVID-19 pandemic under control; these measures should be further strengthened in order to completely bring the pandemic to an end.

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Conflict of interest disclosure
The author declared no conflict of interest.

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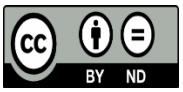

Table 1: Age and Gender distribution of patients who underwent Upper GI Endoscopy.

	Gender		
Age Group	**Males**	**Females**	**Total (%)**
< 20	5	2	7 (3.4)
20-29	8	3	11 (5.3)
30-39	17	15	32 (15.4)
40-49	21	11	32 (15.4)
50-59	22	28	50 (24.0)
60-69	15	22	37 (17.8)
70-79	19	14	33 (15.9)
80-89	2	4	6 (2.9)
≥ 90	0	0	0 (0)
Total (%)	**109 (52.4)**	**99 (47.6)**	**208 (100.0)**

Table 2: Age and Gender distribution of patients who underwent Lower GI Endoscopy.

	Gender		
Age Group	**Male(s)**	**Female(s)**	**Total (%)**
< 30	0	0	0 (0)
30-39	2	1	3 (6.2)
40-49	2	5	7 (14.6)

50-59	8	3	11 (22.9)
60-69	6	4	10 (20.8)
70-79	12	0	12 (25.0)
≥ 80	4	1	5 (10.4)
Total (%)	**34 (70.8)**	**14 (29.2)**	**48 (100.0)**

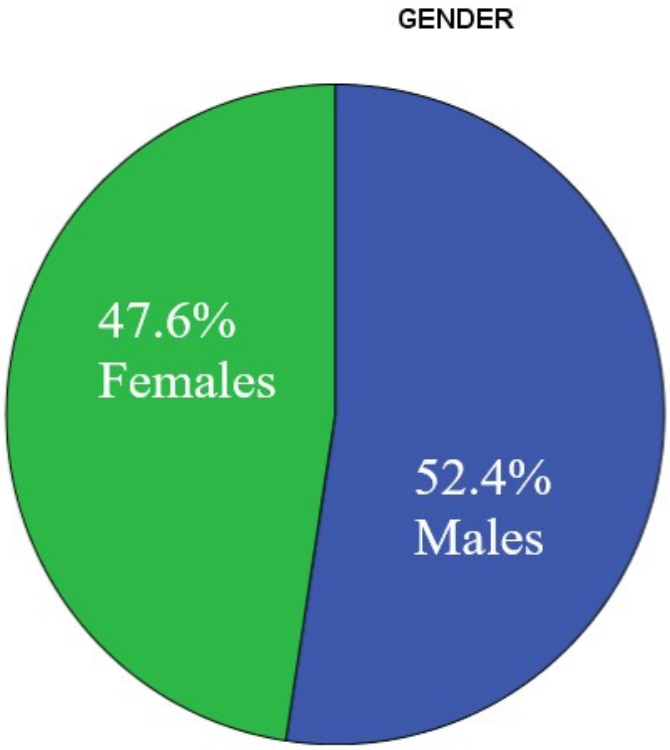

Figure 1: Gender distribution of patients who underwent Upper GI Endoscopy.

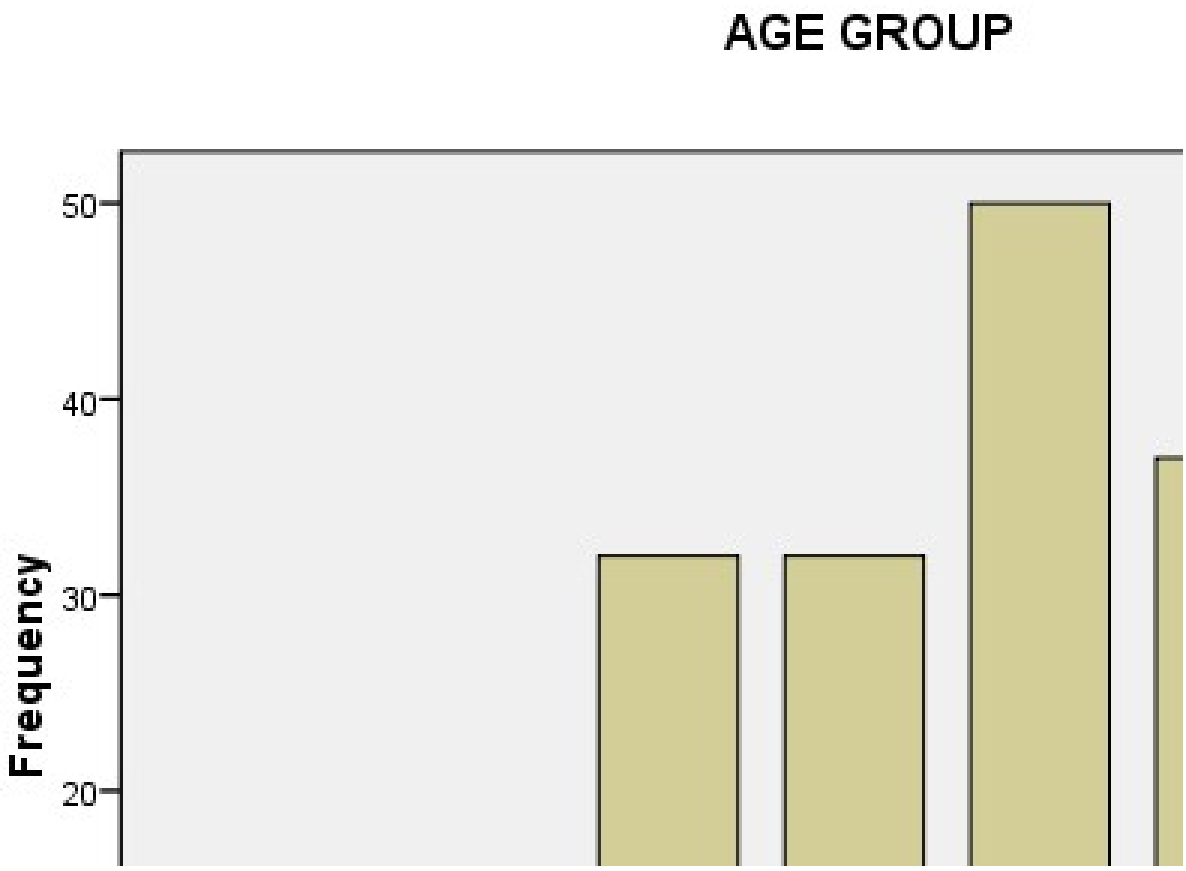

Figure 2: Age group distribution of patients who underwent Upper GI Endoscopy.

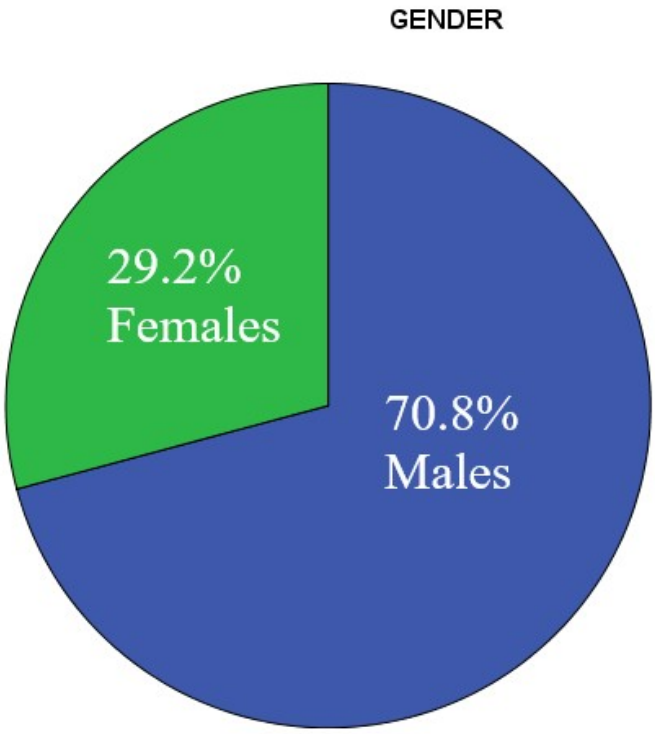

Figure 3: Gender distribution of patients who underwent Lower GI Endoscopy.

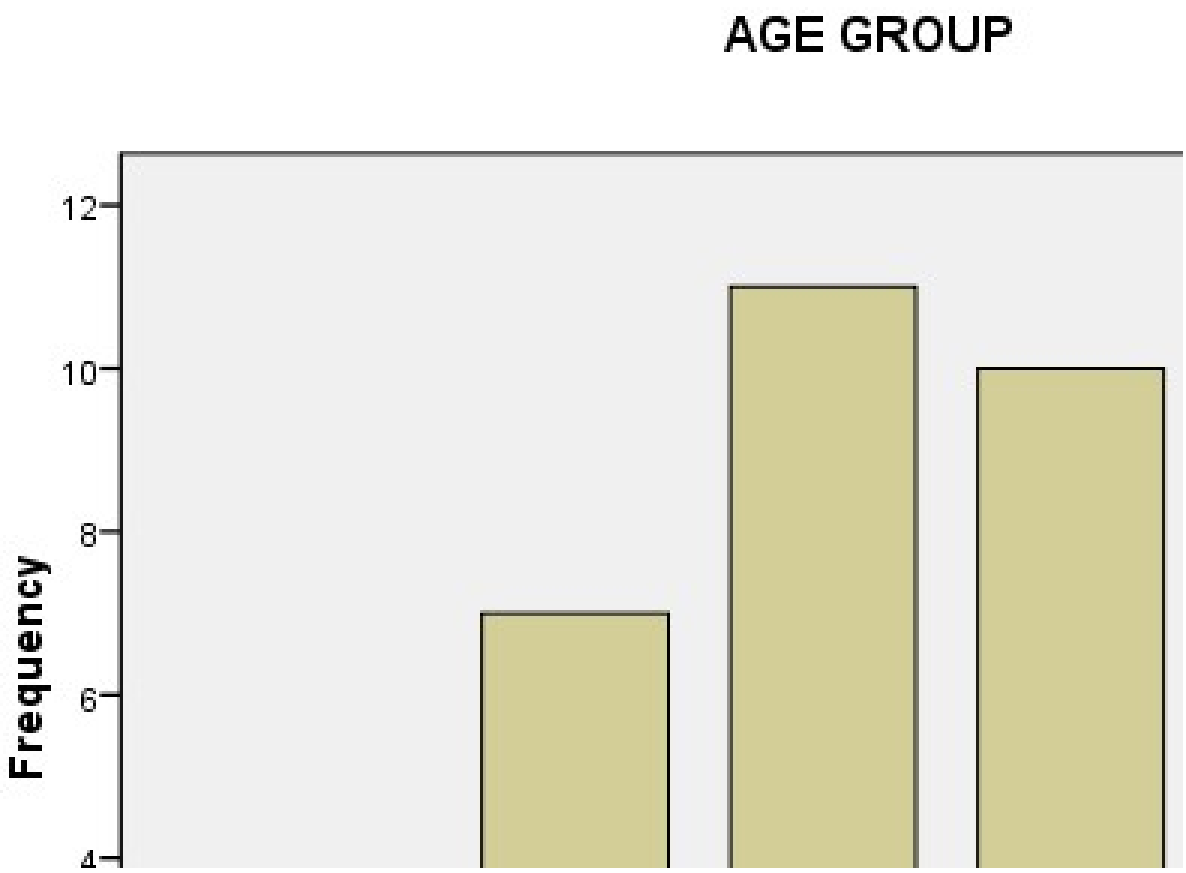

Figure 4: Age group distribution of patients who underwent Lower GI Endoscopy.

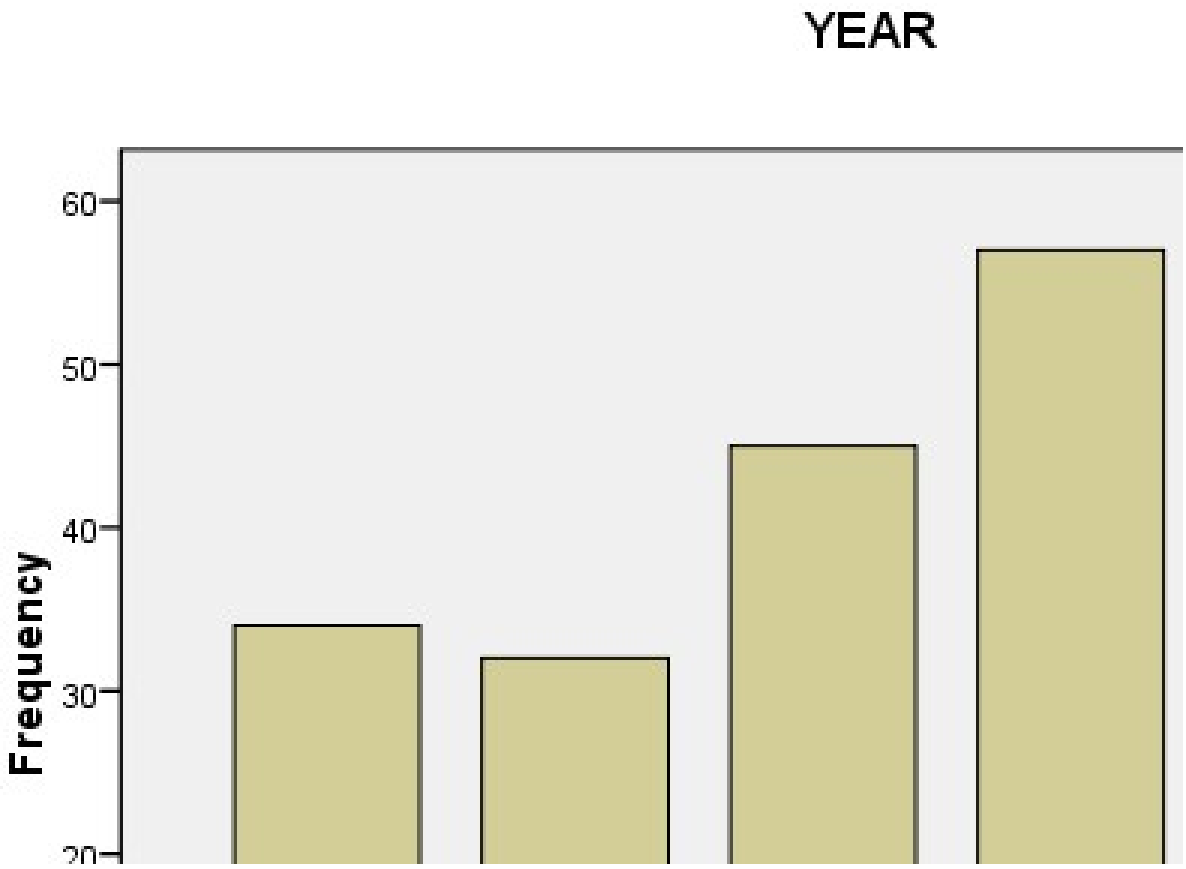

Figure 5: Frequency of Upper Gastrointestinal Endoscopies over a five-year period (Feb. 2016 to Feb. 2021).

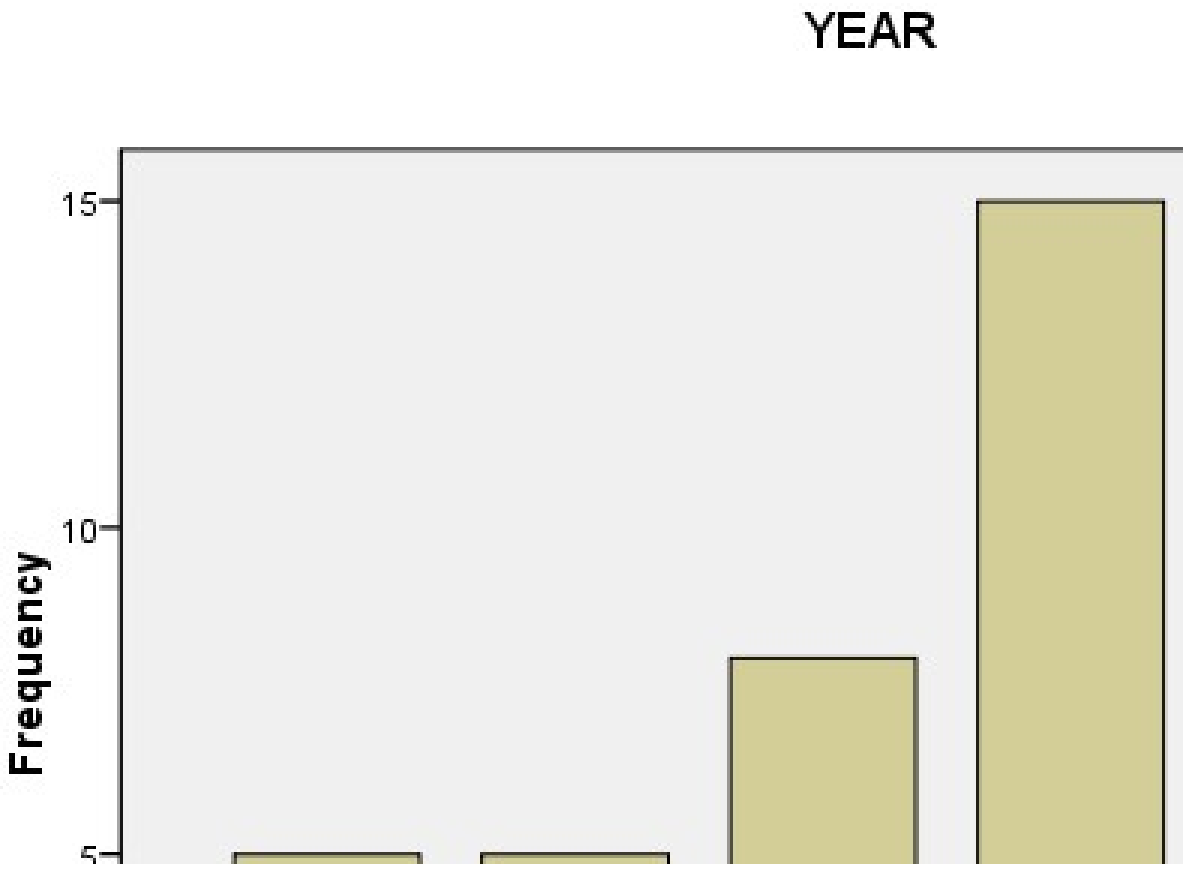

Figure 6: Frequency of Lower Gastrointestinal Endoscopies over a five-year period (Feb. 2016 to Feb. 2021).