e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(12); 799-807

Original Research Article

Evaluation of Helicobacter Pylori in Patients Undergoing Upper GI Endoscopy

Jayaprakash S.[1], Suganya C.[2], Thirumalaisami[3]

[1]Assistant Professor, Department of General Surgery, Karuna Medical College, Palakkad, Kerala, India.
[2]Junior Resident, Department of General Surgery, Karuna Medical College, Palakkad, Kerala, India.
[3]Professor & HOD, Department of General Surgery, Karuna Medical College, Palakkad, Kerala, India.

Received: 25-10-2022 / Revised: 25-11-2022 / Accepted: 20-12-2022
Corresponding author: Dr. Jayaprakash S.
Conflict of interest: Nil

Abstract

Background: Helicobacter pylori (i.e. H. pylori), previously known as Campylobacter, is a gram-negative, helically shaped, microaerophilic bacterium usually found in the stomach. Its helical shape (from which the genus name, helicobacter, derives) is thought to have evolved in order to penetrate the mucosal lining of the stomach and thereby establish infection.

Aim: To evaluate the prevalence of helicobacter pylori in patients undergoing upper gastrointestinal endoscopy.

Material and Method: The present prospective study was conducted in the department of Surgery among 150 subjects who underwent endoscopy (done in all patients with upper abdominal pain of unknown etiology). The data was collected by a preformed structured interviewer-administered questionnaire that was pretested with modifications made prior to its use in the study. The patients were interviewed that requests for the demographic, socioeconomic status, medical history and previous history of taking any medications and supplements. Endoscopy was carried out using the "Olympus GIF -LV1" forward viewing video esophagogastroduodeno scope. RUT was performed by the following method i.e. One drop distilled water was put on urea containing strip.

Results: Helicobacter pylori infection was present in 76.8% and 56.4% of the subjects living in urban and rural location respectively. Bloating was present in 72% of the subjects. Endoscopic abnormality was reported among 87.3% and 12.7% of the subjects with and without Helicobacter pylori infection. Chronic gastritis, duodenal ulcer and gastric ulcer was revealed among 86.36%, 88% and 87.5% of the subjects with Helicobacter pylori infection.

Conclusion: In conclusion, there is a high prevalence of H. pylori infection in rural population in this study. Though, the prevalence of H. pylori gastritis and associated abdominal symptoms is high in number but serious gastrointestinal complications develop in few.

Keywords: Helicobacter pylori, Gastrointestinal Endoscopy, RUT.

Introduction

Helicobacter pylori (i.e. H. pylori), previously known as Campylobacter, is a gram-negative, helically shaped, microaerophilic bacterium usually found in

the stomach.1 Its helical shape (from which the genus name, helicobacter, derives) is thought to have evolved in order to penetrate the mucosal lining of the stomach and thereby establish infection.2 The bacterium was first identified in 1982 by Australian doctors Barry Marshall and Robin Warren, who found that it was present in a person with chronic gastritis and gastric ulcers, conditions not previously believed to have a microbial cause3,4.

Inflammation induced due to this bacteria cause duodenal ulcer, gastric ulcer as well as cancers. Mode of transmission of H. pylori is faeco-oral or oro-oral route. Around 50 percent of world's population harbours this pathogen in upper gastrointestinal (GI) tract, but the prevalence of this infection varies worldwide, being as low as 10 percent in developed Western nations to as high as 80 percent in developing countries including India5.

The most common complaint of upper gastrointestinal disorders worldwide is dyspepsia, approximately 10-20% in the Asia Pacific region. It forms 1/3rd of individuals seeking healthcare and is relapsing, complicated and confusing. Dyspepsia is a poorly characterized syndrome, defined as chronic or recurrent central upper abdominal pain or discomfort, which can be attributed to the upper gastrointestinal tract. It can incorporate a variety of symptoms such as epigastric discomfort, early satiety, heart burn, upper abdominal fullness, bloating, belching or nausea6.

A wide range of laboratory investigations are available for diagnosis of H. pylori. The tests belong to non-invasive group and invasive group. Non-invasive tests include urea breath test, serological immunoglobulin G and immunoglobulin M detection, saliva and urinary antibody test, and stool antigen test. Invasive tests are endoscopy‑based tests, which include histopathological examination, rapid urease test (RUT), and polymerase chain reaction.7 The choice of test depends to a large extent on availability and cost. Other important factors are: clinical situation, population prevalence of infection, pretest probability of infection, differences in test performance, and factors that may influence the test results, such as the use of anti-secretory treatment and antibiotics.

Endoscopy is the ideal procedure for identifying organic diseases of the foregut, but this service is yet to be widely available in developing countries. Helicobacter pylori infection is known to be among the most common human infections worldwide; approximately 50% of the world's population is infected with H. pylori (Brown, 2000; Go, 2002)8. Upper gastrointestinal (GI) endoscopy is an established method, however it is not routinely performed9. Availability of endoscopy at a primary care facility provides greater population access and thus enables earlier diagnosis of digestive tract diseases.10

The evaluation of upper gastrointestinal symptoms in a medically resource limited area can be challenging. The lack of medical personnel, including those trained in upper endoscopy and limited facilities, can limit the ability for appropriate evaluation of patients with upper gastrointestinal complaints. Data on upper gastrointestinal diseases, H. pylori prevalence based on urease test among patients with upper gastrointestinal symptoms undergoing endoscopy in India are limited. Hence the present study was conducted to evaluate the prevalence of helicobacter pylori in patients undergoing upper gastrointestinal endoscopy.

Material and Method

The present prospective study was conducted in the department of Surgery among 150 subjects who underwent endoscopy (done in all patients with upper abdominal pain of unknown etiology).

Patients were enrolled in the study after obtaining written informed consent and approval from Institutional Ethical Committee.

Inclusion criteria:

1. All adult patients aged above 18 years with dyspepsia and abdominal pain of unknown etiology.
2. Patients diagnosed with chronic gastritis, gastric/duodenal ulcers on gastro-duodenoscopy
3. Patients on NSAID's for more than one month duration.

Exclusion criteria:

4. Patients with deranged coagulation profile.
5. Patients who are medically unstable.
6. Patients who refuse endoscopy.
7. Patients suffering from cholecystitis, cholelithiasis, pancreatitis.
8. Patients with suspected perforation.
9. Patients on proton pump inhibitor therapy or antibiotic therapy within last 1 month.
10. Pregnant and Lactating women.
11. Patients with oesophageal growths on endoscopy.

The data was collected by a preformed structured interviewer-administered questionnaire that was pretested with modifications made prior to its use in the study. The patients were interviewed that requests for the demographic, socioeconomic status, medical history and previous history of taking any medications and supplements. Other characteristics recorded were:

1. Smoking
2. Family history
3. Alcohol history
4. Duration of disease and symptoms
5. Treatment or any antimicrobial therapies during 3 months.
6. Any previous and/or present history of any complains of gastritis and clinical sign.

Procedure:

Endoscopy was carried out using the "Olympus GIF -LV1" forward viewing video esophagogastroduodenoscope. The patients were taken for upper gastrointestinal endoscopy after making them fast overnight. Lignocaine viscous or oral lignocaine sprays were given to the patient 5-10 minutes before the procedure for the local anesthetic effect. The upper gastro-intestinal endoscopy was conducted with flexible, fibrooptic endoscope with patients in left lateral positions. The endoscopy was considered normal on visualizing mucosa, which is pink in color, smooth, and lustrous. 2-3 endoscopic biopsy fragments were obtained from each patient from the antrum.

RUT was performed by the following method i.e. One drop distilled water was put on urea containing strip. Biopsy material was added and Test was considered negative if there is no change in colour and positive if color changed to pink within 30 min and weekly positive if the change occurred after 2 h.

Quality:

Endoscopists' competence was evaluated with a validated questionnaire covering technical quality of the endoscopy and diagnostic accuracy. A five-point scale i.e. very good, good, fair, poor and very poor was used to classify endoscopists' work on six dimensions considered fundamental in upper GI endoscopy:

(1) Appropriateness of the indication

(2) Time between patient arrival and procedure

(3) Procedure explanation given the patient by the attending physician

(4) Technical quality of the endoscopy

(5) Quality of diagnostic report

(6) Equipment cleaning and disinfection

Statistical analysis: Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and

standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using chi square test and the level of significance was set at $p < 0.05$.

Results

In our study, incidence of Helicobacter pylori infection was 64%. Out of 150 subjects, 52 (34.67%) were females and 98 (65.33%) were males, hence showing dominancy of males. Helicobacter pylori infection was present in 59.6% and 66.3% of the females and males respectively. Maximum subjects were in the age group of >60 years. Subjects were distributed equally in other age groups. Helicobacter pylori infection was found maximum in age group of 51-60 years (76.92%) followed by >60 years (73.92%) while it was found least in age group of 41-50 years (50%). Helicobacter pylori infection was present in 76.8% and 56.4% of the subjects living in urban and rural location respectively. When Helicobacter pylori infection was compared according to location, it was found to be statistically significant as $p<0.05$ in the present study (graph 1).

Helicobacter pylori infection was present in 70% and 47.5% of the subjects having vegetarian and mixed diet respectively with statistically significant difference as $p<0.05$. Abdominal pain was present in 86.67% of the subjects. Helicobacter pylori infection was present in 69.2% and 30% of the subjects with and without abdominal pain respectively. When Helicobacter pylori infection was compared according to abdominal pain, it was found to be statistically significant as $p<0.05$ in the present study (table 1).

Table 1: Distribution of Helicobacter pylori infection according to diet and Abdominal Pain

Helicobacter pylori		**Diet**		**Total**
		Mixed Diet	**Vegetarian**	
Absent	N	21	33	54
	%	52.5%	30.0%	36.0%
Present	N	19	77	96
	%	47.5%	70.0%	64.0%
Total	N	40	110	150
	%	100.0%	100.0%	100.0%
Chi Square		6.45		
p value		0.01*		
Helicobacter pylori		**Abdominal Pain**		**Total**
		No	**Yes**	
Absent	N	14	40	54
	%	70.0%	30.8%	36.0%
Present	N	6	90	96
	%	30.0%	69.2%	64.0%
Total	N	20	130	150
	%	100.0%	100.0%	100.0%
Chi Square		11.58		
p value		0.001*		

*: statistically significant

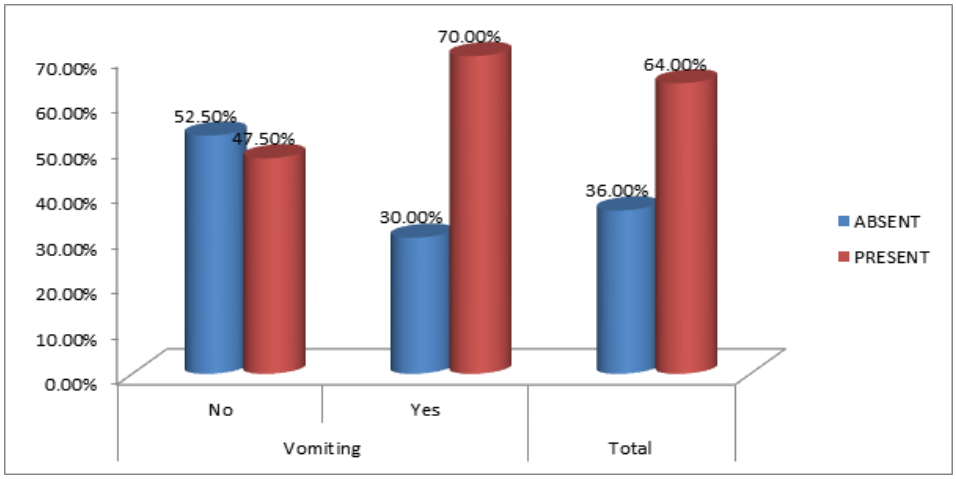
Gastric fullness was present among 68.67% of the subjects. Helicobacter pylori infection was present in 70.9% and 48.9% of the subjects with and without gastric fullness respectively (table 2).

Table 2: Distribution of Helicobacter pylori infection according to Gastric fullness

Helicobacter pylori		Gastric Fullness		Total
		No	Yes	
Absent	N	24	30	54
	%	51.1%	29.1%	36.0%
Present	N	23	73	96
	%	48.9%	70.9%	64.0%
Total	N	47	103	150
	%	100.0%	100.0%	100.0%
Chi Square		6.74		
p value		0.009*		

*: statistically significant

Vomiting was present among 73.33% of the subjects. Helicobacter pylori infection was present in 70% and 47.5% of the subjects with and without vomiting respectively with statistically significant difference (graph 1).



Graph 1: Distribution of Helicobacter pylori infection according to Vomiting

Bloating was present in 72% of the subjects. Helicobacter pylori infection was present in 69.4% and 50% of the subjects with and without bloating respectively with statistically significant difference (table 3).

Table 3: Distribution of Helicobacter pylori infection according to Bloating

Helicobacter pylori		Bloating		Total
		No	Yes	
Absent	N	21	33	54
	%	50.0%	30.6%	36.0%
Present	N	21	75	96
	%	50.0%	69.4%	64.0%
Total	N	42	108	150
	%	100.0%	100.0%	100.0%
Chi Square		4.96		
p value		0.03*		

*: statistically significant

Endoscopic abnormality was reported among 87.3% and 12.7% of the subjects with and without Helicobacter pylori infection in the present study (table 4).

Table 4: Association between Endoscopic Abnormality and Final Helicobacter pylori

Helicobacter pylori		Endoscopic Abnormality		Total
		Absent	Present	
Absent	N	40	14	54
	%	100.0%	12.7%	36.0%
Present	N	0	96	96
	%	0.0%	87.3%	64.0%
Total	N	40	110	150
	%	100.0%	100.0%	100.0%
Chi Square		96.98		
p value		<0.01*		

*: statistically significant

Chronic gastritis, duodenal ulcer and gastric ulcer was revealed among 86.36%, 88% and 87.5% of the subjects with Helicobacter pylori infection (table 5).

Table 5: Pathological diagnosis according to Helicobacter pylori infection

Final Helicobacter pylori		Type				Total
		None	Chronic gastritis	Duodenal ulcer	Gastric ulcer	
Absent	N	40	6	6	2	54
	%	100.0%	13.64%	12.0%	12.5%	36.0%
Present	N	0	38	44	14	96
	%	0.0%	86.36%	88.0%	87.5%	64.0%
Total	N	40	44	50	16	150
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Discussion

Identification of upper gastrointestinal symptoms, associated pathology and H. pylori will enable establishment of preventive measures for these diseases and in addition decrease the need for endoscopy especially in this resource limited setting. Hence the present study was conducted to evaluate the prevalence of Helicobacter pylori in patients undergoing upper gastrointestinal endoscopy.

In our study, incidence of Helicobacter pylori infection was 64%. In a study by Adlekha et al1, histopathological examination showed H. pylori positivity in 59.4% (315/530) cases and RUT showed H. pylori positivity in 57.7% (306/530) cases. Diagnosis of H. pylori infection was made if both or either of the tests was positive. 62.0% (329/530) cases were found to be H. pylori positive, on combining both test results. This is in according to our study. Similarly Agarwal et al [11], found total 41 (76%) patients out of 54, positive for H. pylori by RUT. By serology, they found 81% of patients positive. Collectively, total 85% of patients were found to be positive for H. pylori and 15 patients were negative.

Gastritis, gastric ulceration, and gastric malignancies have many etiological factors, among which H. pylori infection is the principle cause. H. pylori infection is dependent upon many variables such as

age, sex, socioeconomic status, dietary habits, genetic, and immunological factors. In the present study, we did not get a significant difference in H. Pylori prevalence according to gender. Out of 150 subjects, 52 (34.67%) were females and 98 (65.33%) were males, hence showing dominancy of males. Helicobacter pylori infection was present in 59.6% and 66.3% of the females and males respectively. This is in concordance with the study results of Tarkhashvili et al [12], and Shokrzadeh et al [13]. In contrast a study by Kaore et al showed higher prevalence in male gender [14]. Adlekha et al. [15] in their study analyzed data of 530 patients, out of which 61.9% (328/530) were males and 38.1% (202/530) were females. This gender distribution is similar to our study. Similarly Agarwal et al [11], reported female (37) to male (63) ratio of 1–1.7.

Maximum subjects were in the age group of >60 years. Subjects were distributed equally in other age groups. Helicobacter pylori infection was found maximum in age group of 51-60 years (76.92%) followed by >60 years (73.92%) while it was found least in age group of 41-50 years (50%). In a study by Adlekha et al [15], age distribution of H. pylori infection did not show any trend towards increase or decrease in infection with the advancing age. Though maximum percent of H. pylori positivity −75% (9/12) was seen in the age group of 81‑90 years, this can be attributed to much less number of individuals studied in this group, compared to other age groups. These findings are similar to our study. This is similar to the observations laid by Tarkhashvili et al [12], though few studies such as Shokrzadeh et al. [13] and Kaore et al. [14] reported increased H. pylori infection in age groups of 20-40 years than the older age group.

Out of 150 subjects, 94 (62.67%) and 56 (37.33%) subjects belonged to rural and urban location respectively. Helicobacter pylori infection was present in 76.8% and 56.4% of the subjects living in rural and urban location. When Helicobacter pylori infection was compared according to location, it was found to be statistically significant as $p<0.05$ in the present study.

Similarly Agarwal et al [11], reported that 62 patients belong to rural area and 38 were from urban area.

In our study, Helicobacter pylori infection was present in 70% and 47.5% of the subjects having vegetarian and mixed diet respectively. Therefore chances of Helicobacter pylori infection was found more in subjects with vegetarian diet. Agarwal et al [11], revealed similar findings in their study.

Abdominal pain was present in 86.67% of the subjects. Helicobacter pylori infection was present in 69.2% and 30% of the subjects with and without abdominal pain respectively. When Helicobacter pylori infection was compared according to abdominal pain, it was found to be statistically significant as $p<0.05$ in the present study. In a study by Agarwal et al [11], 81% of patients complained abdominal pain which is somewhat similar to the study done by Segni M. Ayana et al [16], where epigastric pain was reported by 86.1% of patients with dyspepsia but in both the studies apart from this, other clinical complaints greatly varied.

Gastric fullness was present among 68.67% of the subjects. Helicobacter pylori infection was present in 70.9% and 48.9% of the subjects with and without gastric fullness respectively. When Helicobacter pylori infection was compared according to gastric fullness, it was found to be statistically significant as $p<0.05$ in the present study. Agarwal et al [1], revealed similar findings in their study. Endoscopic abnormality was reported among 87.3% and 12.7% of the subjects with and without helicobacter pylori infection respectively in the present study. There was high significant

correlation between endoscopic abnormality with H. pylori infection. Similarly in a study by Adlekha et al [15], the correlation of endoscopic abnormality with H. pylori infection was statistically highly significant with a $P < 0.01$, proving endoscopic changes to be a sensitive indicator of H. pylori infection. This is in contrast to the observation laid by Jemilohun et al [17], in which the correlation was not statistically significant. This can be attributed to a lower number of cases (86) being evaluated in their study compared to the present study. This difference may be attributed to how patients were selected and the inclusion and exclusion criteria used in different studies, differences in socioeconomic status, and healthcare seeking behaviour. In our study; gastritis, duodenal ulcer and gastric ulcer was revealed among 86.36%, 88% and 87.5% of the subjects respectively with helicobacter pylori infection. Similarly in a study by Adlekha et al [15], association of duodenal ulcer and gastric ulcer with H. pylori infection was found to be statistically significant in 85.7% (18/21) patients with peptic ulcer and 90.5% (19/21) patients with dysplasia/carcinoma. Our findings are in comparable to the study by Zapata-Colindres et al [18], and Ahmad et al [19], documenting H. pylori prevalence in gastric ulceration patients to be 80% and 84% respectively. Cotran et al [20], reported the international association of H. pylori with gastric ulceration to be more than 70%.

The present study has significant advantages like being computation of association of multiple variables with H. pylori infection. [21] The present study has a major limitation that association of H. pylori infection with lifestyle related modifiable factors was not accessed. There is a need of another broader study in this region, assessing the association of different demographic and life style factors and preexisting conditions like diabetes mellitus with prevalence of H. pylori infection and follow up of the patients after treatment and lifestyle modifications.

Conclusion

In conclusion, there is a high prevalence of H. pylori infection in rural population in this study. Though, the prevalence of H. pylori gastritis and associated abdominal symptoms is high in number but serious gastrointestinal complications develop in few. Absolute prevention of these complications and relief from the distressing abdominal symptoms can be achieved through early detection by conventional and affordable diagnostic methods and empirical treatment with anti H. pylori therapy.

References

1. Alfarouk KO, Bashir AHH, et al. The possible Role of Helicobacter pylori in Gastric Cancer and Its Management. Frontiers in Oncology. 2019: 9.
2. Yamaoka Y. Helicobacter pylori: Molecular Genetics and Cellular Biology. Caister Academic Pr. 2008: 31-38.
3. Marshall BJ, Warren JR. Unidentified curved bacilli on gastric epithelium in active chronic gastritis. The Lancet. 1983; 321 (8336): 1273-5.
4. Marshall BJ, Warren JR. Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. The Lancet. 1984; 323 (839 0): 1311-5.
5. Rimbara E, Fischbach LA, Graham DY. Optimal therapy for Helicobacter pylori infections. Nat Rev Gastroenterol Hepatol 2011; 8: 79-88.
6. Graham DY, Adam E, Reddy GT, Agarwal JP, Agarwal R, Evans DJ Jr., et al. Seroepidemiology of Helicobacter pylori infection in India. Comparison of developing and developed countries. Dig Dis Sci 1991; 36: 1084-8.
7. Malfertheiner P, Megraud F, O'Morain C et al. Current concepts in the

management of helicobacter pylori infection: The Maastricht III consensus report. Gut 2007;56: 772-81.
8. Brown, L.M. Helicobacter pylori: epidemiology and routes of transmission. Epidemiology Review 2000; 22:283-297.
9. Baako BN, Darko R. Incidence of Helicobacter pylori infection in Ghanaian patients with dyspeptic symptoms referred for upper gastrointestinal endoscopy. West Afr J Med. 1996;15(4):223–7.
10. Luna Morales EC, Sierra Pérez DC, Gandul Salabarría L. La transformación del policlínico en Cuba de cara al siglo XXI [Internet]. Rev Cubana Med Gen Integr. 2009; 25(2): 1–10.
11. Agarwal PK, Badkur M, Agarwal R, Patel S. Prevalence of Helicobacter pylori infection in upper gastrointestinal tract disorders (dyspepsia) patients visiting outpatient department of a hospital of North India. J Family Med Prim Care 2018; 7: 577-80.
12. Tarkhashvili N, Chakvetadze N, Mebonia N et al. Traditional risk factors for Helicobacter pylori infection not found among patients undergoing diagnostic upper endoscopy—Republic of Georgia, 2007–2008. Int J Infec Dis 2012: e697–e702.
13. Shokrzadeh L, Baghaei K, Yamaoka Y et al. Prevalence of Helicobacter pylori infection in dyspeptic patients in Iran. Gastroenterol Insights 2012; 4: 24-7.
14. Kaore NM, Nagdeo NV, Thombare VR. Comparative evaluation of the diagnostic tests for Helicobacter pylori and dietary influence for its acquisition in dyspeptic patients: A rural hospital-based study in central India. JCDR 2012; 6: 636-41.
15. Adlekha S, Chadha T, Krishnan P, Sumangala B. Prevalence of helicobacter pylori infection among patients undergoing upper gastrointestinal endoscopy in a medical college hospital in Kerala, India. Ann Med Health Sci Res 2013; 3: 559-63.
16. Ayana SM, Swai B, Maro VP. Upper gastrointestinal endoscopic findings and prevalence of Helicobacter pylori infection among adult patients with dyspepsia in northern Tanzania. Tanzania Journal of Health 2014; 16 (1):1-6.
17. Jemilohun AC, Otegbayo JA, Ola SO, Oluwasola OA, Akere A. Prevalence of Helicobacter pylori among Nigerian patients with dyspepsia in Ibadan. Pan Afr Med J 2010; 6:18.
18. Zapata-Colindres JC, Zepeda-Gomez S, Montano-Loza A et al. The association of Helicobacter pylori infection and nonsteroidal anti-inflammatory drugs in peptic ulcer disease. Can J Gastroenterol 2006; 20: 277-80.
19. Ahmad FF, Jaffar R, Khan I. Helicobacter Pylori detection in chronic gastritis: A comparison of staining methods. J Ayub Med Coll Abbottabad 2011; 23:112-14.
20. Cotran RS, Kumar V, Collins T. The gastrointestinal tract. In: Robbins Pathologic Basis of Disease. 8th ed. Philadelphia: WB Saunders; 2010; 763-831.
21. Arellano A., Arellano A., & Arellano D. Gluteoplasty Implants and Lipotransfer Technique. Journal of Medical Research and Health Sciences. 2022;5(11): 2329–2338.