PREVALENCE OF *HELICOBACTER PYLORI* INFECTION IN DISTRICT MARDAN

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Abstract

Helicobacter pylori are endemic, affect about half population of the world, and causes gastric ulcer, peptic ulcer, gastric cancer and classified as a class I carcinogen by the WHO. It is estimated 4.4 billion people were affected globally. This study was conducted to find out the prevalence of H. pylori infection in different region of Mardan, KPK via questionnaire and personal interaction. For this purpose different hospitals were visited in order to collect the data of require patient after the consent approval from their parents and guardians. The detail information about, age, gender and area were collected from the subject of H. pylori infection. Total 260 patients were included in the study. The overall prevalence of H. pylori was found 46%. The gender wise analysis showed that the prevalence of H. pylori infection was dominant in male 55% as compared to female 45%. The age wise prevalence of infection in 10 to 25 years age group was found to be 58% and 26 to 40 years was found 34%. While the 40 and above years age group was 8%. According to the gender wise prevalence, male was more affected as compare to female. The age wise survey predicted that the lower age group (10 to 25 year) was more affected as compared to middle and higher age groups. The result also showed that urban areas were more affected by H. pylori as compare to rural areas.

Keywords: H. pylori, Age wise, Gender wise, Area wise

1. INTRODUCTION

H. pylori is the major infectious agent of chronic superficial gastritis and plays a main role in the development of peptic ulcer disease and adenocarcinoma, hence classified as a class I carcinogen by the WHO (O'Connor et al., 2017). *H. pylori* are considered the most common bacterial infection of the world, it is estimated that *H. pylori* affected 50 to 60% of the world population (Mentis et al., 2019). *H. pylori* is gram negative, has dense granule body, microaerophilic spiral shape bacteria, usually 2 to 4 micron meter in length and 0.2 micron meter in width that colonize in the gastric mucosa and cause stomach infection (Cadamuro et al., 2014). *H. pylori* belong to the phylum Proteobacteria, class Epsilonprobacteria, and order Camplyobacterales Family Helicobacteraceae,

Genus Pylori. *H. pylori* usually acquired during childhood and may persist in the gastric environment throughout life, if not treated in most cases, because it is capable of adaptations to colonize the adverse environment of the stomach (Chey et al., 2017). *H. pylori* produce a number of enzymes, include catalase and urease, which help neutralize host responses and favor colonization. Initially *H. pylori* depend on its urease enzyme to survive in acidic environment, an enzyme responsible for converting urea into bicarbonate and ammonia, and then on its spiral shape and motility to reach the gastric epithelium, where it stick to cell through various specific adhesion molecule. After adhesion reducing the level of vitamin C in the gastric juice. The inhibition of gastric acid secretion favors the environment and able to survive (Suzuki and Hibe, 2007).

Stomach cancer, also known as gastric cancer, is a cancer that develops from the lining of the stomach. Early symptoms may include heartburn, upper abdominal pain, nausea and loss of appetite. The most common cause is infection by the bacterium *H. pylori*, which accounts for more than 60% of cases worldwide stomach cancer is the fifth most-common cancer with 952,000 cases diagnosed. Less than 5% of stomach cancers occur in people under 40 years of age with 81% of that 5% in the age-group of 30 to 39 and 18% in the age-group of 20 to 29 year (Choi et al., 2020).

Peptic ulcer disease is the common disease that damages the mucosa of esophagus, stomach and small intestine i.e. of the duodenum and jejunum. The ulcer occurs due to the hyper secretion of acid*, H. pylori* infection and action of pepsin (Kim et al., 2020).

By the late of 19 century and early of the 20 century some investigator reported finding a new kind of bacteria in the stomach of animal. Dr. Barry Marshell Robin and Warren two Australian researcher find similar spiral bacteria in human stomach, some of whom peptic ulcer disease or gastric cancer (Lichtman., 2017).

It was long standing belief in medical teaching and practice that stress and life style factor were major causes of peptic ulcer disease. It was soon clear that *H. pylori* cause more than 90% of duodenal ulcer and up to 80% of gastric ulcer. Warren and Marshall performed their experiment, leading to identification of a bacterium in 58 of 100 consecutive patients, which successfully cultural. The organism was initially named, campylobacter like organism, campylobacter pylori, but it is now helicobacter pylori in recognition of the fact that this organism distinct from member of the genus campylobacter (Atherton and Blaser, 2009).

H. pylori are one of the most common bacteria responsible for chronic infection worldwide. Its reservoir is essentially human. Reported observations in general support a person to person mode of transmission that occurs most frequently early in life, There are three routes of transmission I) fecal-oral ii) oral-oral, iii) latrogenic (Megraud, 1995).

The first, and most common, mode of transmission is latrogenic, in which tubes or endoscopes that have been in contact with the gastric mucosa of one individual are used for another patient. Occupationally acquired infections usually in which infection is transmitted from a patient to staff member have also been reported, especially among endoscopists and gastroenterologists. However, in quantitative terms the iatrogenic route is considered to be marginal (Van Duynhoven and Jonge, 2001).

The second possible route is fecal–oral*. H. pylori* have been isolated from the feces of infected young children, but isolation from adults' feces has been rare. Feces contaminated water may be source of infection (Megraud, 1995).

The third possible route of transmission is oral–oral. Few reliable studies have cultured H. pylori from the oral cavity .Possible oral–oral transmission has been investigated in the eating of

Premasticated food among some ethnic groups, the use of the same spoon by both mother and child, intimate oral–oral contact, and aspiration from vomiting (Van Duynhoven and Jonge, 2001).

Diagnostic tests are usually divided into invasive (endoscopic-based) and noninvasive methods. Invasive diagnostic tests include endoscopic image, histology, rapid urease test, culture, and molecular methods. Non-invasive diagnostic tests included urea breath test, stool antigen test, serological, and molecular examinations (Wang, 2015). Following are the tests to diagnose *H. pylori*: Endoscopy, histology, rapid urease tests, culture, rapid urease tests, UBT test, antibody-based tests, and saliva and urine test for *H. pylori* (Skrebinska et al., 2018).

H. pylori infected about half population of the world. It has been estimated that more than 50% of the population aged 5 years is infected and this rate may exceed 90% during adulthood. However, actual infection rates vary from one country to another country (Martin Nunez et al., 2019).The prevalence of *H. pylori* is still abundant. The developing world has much higher infection rates than the developed, and this is related to socioeconomic status and levels of hygiene. After the year 2000, cross sectional survey of America reported the prevalence of *H. pylori* became lower than before in European countries. The area with the highest reported prevalence was reported in Africa (70.1%) while the lowest prevalence was reported in Switzerland (18.9%). In Southern Asia, Pakistan and India have shown the highest *H. pylori* prevalence (81%) (Zamani et al., 2018).

In China, *H. pylori* prevalence has been reported as high as83.4%. Many countries such as China, Japan and Bulgaria have experienced can overall increase in the prevalence of *H. pylori* infection over the last 20 years. In Canada, the prevalence of *H. pylori* is approximately 30% (Thung et al., 2016).

In Western Asia, Turkey presented the highest prevalence (77.2%). Among the 62 countries investigated in the most recent global prevalence study in 2018, there were no informative prevalent data about *H. pylori* in UAE. However, in the neighboring countries such as Oman and Saudi Arabia, the prevalence of *H. pylori* was estimated to be 49.1% and 65.9%, respectively. In the Eastern Mediterranean region, *H. pylori* prevalence is up to 80%. High infection rate in this area represent, that population is infected by more than one strain of *H. pylori* (Khoder et al., 2015).

The prevalence of *H. pylori* is 68% in Pakistan population which is very high, because Pakistanis one of the developing country in the south Asia. The reason behind the over prevalence of *H. pylori* is low socio economic status, sanitation problem, illiteracy, lack of awareness, poor hygiene, and dietary insufficiencies during taking clinical history, unavailability of clean water. Prevalence of *H. pylori* infection was highest (63%) in middle age (41 to 60 year) group while lowest (33%) in teen and preteen (<l2) group. In young age (20 t0 40) and old age (>60year) group, the prevalence of *H. pylori* were 50 to 60 % respectively (Rasheed et al., 2012). The high prevalence of *H. pylori* infection in Pakistani population is comparable to the data observed in of developing countries. *H. pylori* infection was significantly associated with presence of household animals and more family members (Rasheed et al., 2012).According to Jafri, *H. pylori* increase with increasing age. Reducing *H. pylori* infection requires improvement in sanitary conditions and educational status of the population (Jafri et al., 2010).

2. MATERIAL AND METHOD

2.1 Research Area

The study area of present research work is different area of Mardan in KPK province of Pakistan. The district is named after Mardan city, which is also the Head Quarter of District Mardan. Mardan is the district of 2.25 million individuals, and also called the heart of KPK. The district lies from 34° 05° to

34º 32º north latitudes and 71º 48º to 72º 25º east longitudes. It is bounded on the north by Buner district and Malakand protected area, on the east by Swabi and Buner district, on the South by Nowshehra district and on the west by Charsaada district and Malakand protected area. The total area of district 1632 squares Kilometer.

2.2 Sample Size

A survey was conducted in order to collect data of *H. pylori* from different hospitals of Mardan. A total of n=260 samples were collected in this research for the prevalence of *H. pylori* in Mardan. No age limits were assigning in the study. All new and old case of *H. pylori* was included.

2.3 Data Assortment

The samples were collected in the microbiology lab of Mardan. Medical Complex and some other private lab (Health Care).The Ethical concern were approved by Women University Mardan. Questioner was built to gather the desirable data. The current investigation was done through the questioner concerning the prevalence of *H. pylori* in Mardan. This survey includes data about age, gender, area.

2.4 Detection of H. pylori infection in Hospital

ELISA was performed for diagnosing of *H. pylori* infection in the patients that came to Mardan Medical Complex.

2.5 Statistical Analysis

The data was analyzed through software (spss Versions 7), calculation were done for frequencies, percentage and ratio. T test was used for testing significances of frequencies between the groups. P value 0.0<5 is considered as statistically significant.

3. RESULT

This chapter provides the overview of the survey that was used for this study. In this chapter a large amount of data were analyzed in order to find out the prevalence of the disease *H. pylori* in district Mardan.

3.1 Overall prevalence of H. pylori in District Mardan

A total 260 cases was collected from MMC and some private laborites. Out of the total n=260 patient n=119 (46%) patient showed the prevalence of *H. pylori* while the remaining n=141 patients (54%) was not diagnosed by *H. pylori* infection (Table 3.1 and Figure 3.1).

Table 3.1: Overall prevalence of *H. pylori* in district Mardan

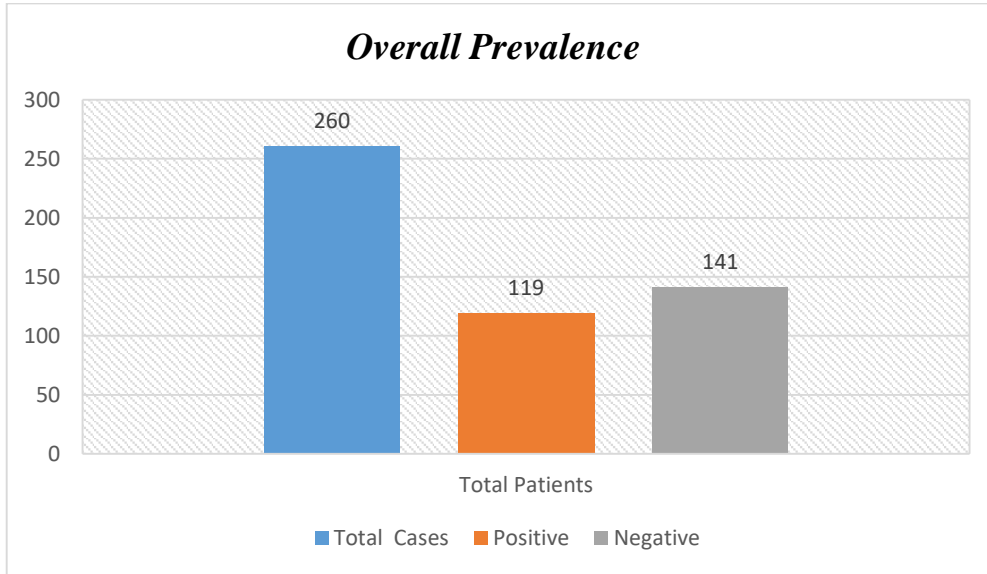| Total Cases(n)	Positive Cases(n)	Positive %age(n)	Negative Cases(n)	Negative %age
260	119	46 %	141	54 %

Figure 3.1: Overall prevalence of *H. pylori* infection in district Mardan

3.2 Gender wise prevalence of H. pylori in District Mardan

The overall prevalence of *H. pylori* was (46%) in which n=65 (55%) were male and remaining n=54 (45%) were female. Result show that, the ratio of *H. pylori* in male is relatively high as compared to female in different region of Mardan (Table 3.2 and Figure 3.2).

Table 3.2: Gender wise prevalence of *H. pylori* in district Mardan

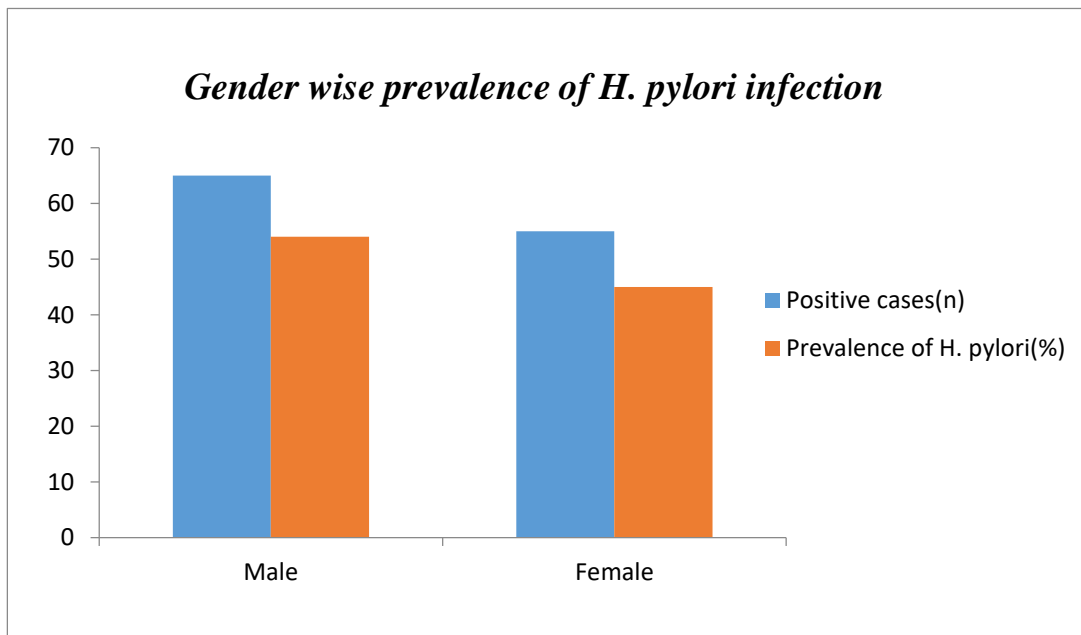| Gender	Total Cases (n)	Positive Cases (n)	Prevalence of *H. pylori* (%)
Male	119	65	55
Female	119	54	45

Figure 3.3: Gender wise prevalence of *H. pylori* in district Mardan

3.3 Independent sample t- test

Independent sample T-test was carried out to find whether *H. pylori* prevalence differ among the gender or otherwise. The table 3.3 shows that f-statistic Levene's test is significant, so several of the two genders (male and female) are not equal; hence results of t-test provided in the second row are valid. The t-Statistic is significant at p<0.05 which means that prevalence of *H. pylori* differ among male and female.

Table 3.3: Results of Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
H. pylori	Equal variances assumed	4.515	.035	1.831	258	.068	.11289	.06166	-.00854	.23432
	Equal variances not assumed			1.830	256.330	.068	.11289	.06170	-.00862	.23439

(Gender Wise)

3.4 Age wise prevalence of H. pylori in district Mardan

The age wise prevalence of *H. pylori* was divided into various group, in which highest prevalence was observed in the age of 10 to 25 year up to n=69 (58%). The ratio of *H. pylori* in middle age group was n=41(34%). The remaining patient are above 40 years of age and have the least number of positive cases n=9 (7%). The high Prevalence was observed in the age of 10 to 25 year age group (Table 3.4 and Figure 3.4).

Table 3.4: Age wise prevalence of H. pylori in district Mardan.

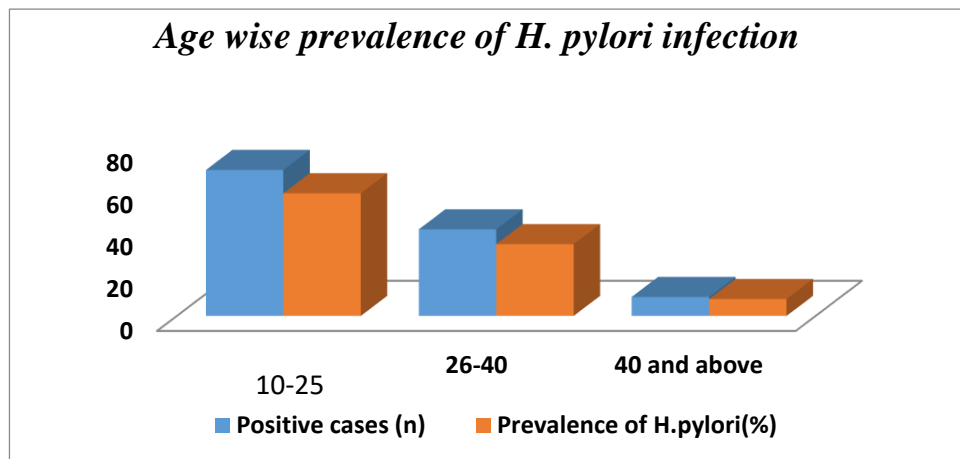| Age	Total cases (n)	Positive cases (n)	Prevalence of *H. pylori* (%)
10-25	119	69	58
26-40	119	41	34
40 and above	119	9	8

Figure 3.4: Age wise prevalence of H. pylori in district Mardan.

3.5 Area wise prevalence of *H. pylori* in district Mardan

The overall prevalence of *H. pylori* in urban area was n=73 (61%) and from rural area n=46 (39%) were recorded. The result shows that urban area has more cases of *H. pylori* as compared to the rural area in Mardan (Table 3.5 and Figure 3.5).

Table 3.54:- Area wise prevalence of *H. pylori* in district Mardan.

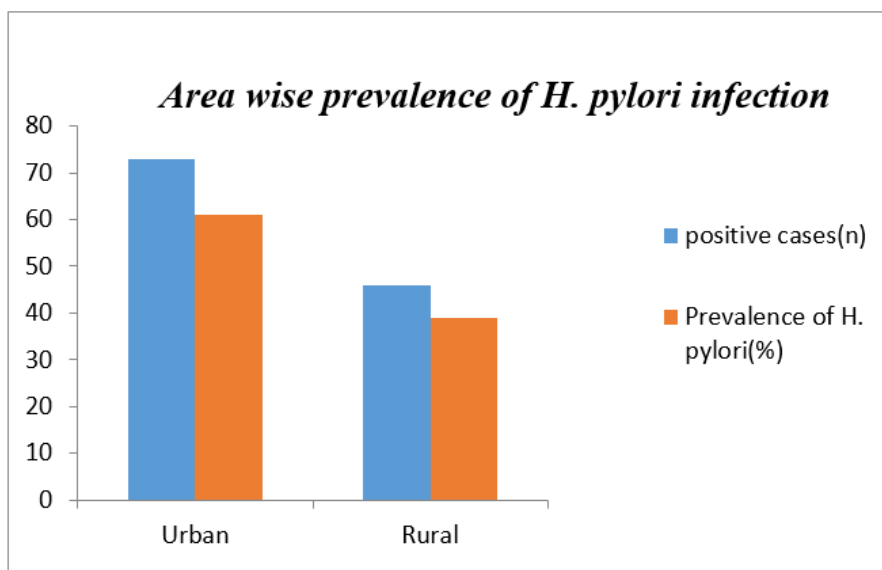| Area	Total cases(n)	Positive cases(n)	Prevalence of *H. pylori* (%)
Urban	119	73	61
Rural	119	46	39

Figure 3.5: Area Wise Prevalence of *H. pylori* infection

4. DISCUSSION

H. pylori are one of the most causative agents of stomach infection. And plays a central role in the development of peptic ulcer disease and adenocarcinoma, hence classified as a class I carcinogen by the World Health Organization (Mukhtar, 2009). The prevalence of *H. pylori* is 68% in Pakistan Population which is very high, because Pakistan is one of the developing countries in the south Asia. The reason behind the over prevalence of *H. pylori* is low socio economic status, sanitation problem, illiteracy, lack of awareness, poor hygiene, and dietary insufficiencies during taking clinical history, unavailability of clean water.

The prevalence of *H. pylori* infection was highest (63%) in middle age (41 to 60 year) group while lowest (33% in teen and preteen (<l2) group. In young age (20 t0 40) and old age (>60year) group, the prevalence of *H. pylori* were 50 to 60 % respectively.

The most elevated number of cases were seen in age of 21-30 years with n=38 (30.9%), trailed by age 31-40 years (21.1%), 11-20 years (14.6%), more prominent than 60 years (13.8%) and 13% in the age of 41-50 years while least cases were found in the age of 51-60 years with n=8 (6.5%). The base age tainted by *H. pylori* in KPK was 12 years though the greatest was discovered 68 years.

This report showed the prevalence of *H. pylori* in district Mardan. The current study showed overall prevalence, gender wise, age wise, area wise and marital wise prevalence respectively. Total of

n=260 samples were collected in the survey from district Mardan. In overall samples 55% were male patients and 54% were female patient.

The overall prevalence of *H. pylori* in total of n=260 cases in district Mardan were 119 cases in which 65 (55%) were male and 54 (45%) were female. The ratio of *H. pylori* in male is relative high as compared to female in district Mardan. This result as same as finding by (Rishma et al., 2018) showed that prevalence of *H. pylori* were high in male 61 (67%) as compare to female 30 (32%). Males are highly infected from *H. pylori* due to lack of care. Most of the people are laborer in district Mardan. They work outside and use public washrooms and do not take care of cleanness and unavailability of clean water. Most of the cases were observed in age of 10-25 years with132 (58%), followed by age 26-40 years with 99 (34%) while least number of cases were found in the age of 41-55 years with 29 (8%) cases. Due to extensive use of tobacco in the form of smoking, which cause *of H. pylori*, Illiteracy is high in rural areas of district Mardan due to which they have lack of awareness which also leads to suffer from many disease.

In area wise prevalence most of the cases were reported for *H. pylori* infection from urban area while on the other side in rural area 46 (39%) cases were reported for *H. pylori* infection. The study shows that most people are infected from *H. pylori* in urban area as compared to rural area because of usage of unhealthy food which is not thoroughly cooked.

5. CONCLUSION

The study concludes that the overall prevalence of *H. pylori* in district Mardan is approximately 46% in which male were more infected as compared to females. The study also showed the high rate of *H. pylori* were observed in young aged from 10-25 (58%) as compare to other age group.

List of Abbreviation

H. pylori	*Helicobacter pylori*
WHO	World Health Organization
ELISA	Enzyme Linked Immuno Sorbent Assay
GI	Gastro intestinal
TMB	Tetramethylbenzidine

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