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Prevalence and Associated Risk Factors of Helicobacter Pylori Infection among Patients Complaint Upper Gastrointestinal Tract Symptoms

Haidari Said Rahatullah[1,2*]

[1]Medical Director, Chief of Medical Ward, Spinghar Momand Curative and Teaching Hospital, Jalalabad city, Nangarhar, Afghanistan.

[2]Lecturer at Spinghar Institute of Higher Education, Medical Faculty, Jalalabad City, Nangarhar, Afghanistan.

[*]Corresponding Author's Email: saidrahatullahhaidary@gmail.com

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Abstract

Aim: This study sought to investigate the prevalence of *H. pylori* infection and its associated factors among patients' complaints upper gastrointestinal tract symptoms who attended Spinghar Momand Curative and Teaching Hospital, Jalalabad city, Afghanistan.

Methods: Analytical cross-sectional study was performed among patients' complaint upper gastrointestinal tract symptoms between September 2022 and January 2023. The diagnosis of *H. pylori* infection was done using antigen rapid stool test and data was analyzed through SPSS version 20. The study included 122 patients.

Results: The study found that the overall prevalence of *H. pylori* infection was 71.3 %. The prevalence for females was 47 (54 %), males 40 (46 %), 18-25 years old was 32 (26.2 %), 25-50 years old 69 (56.6 %), above 50 years old 21 (17.2 %), urban residence 24 (28 %), rural residence 63 (72.4 %), married (77 %), unmarried 20 (23 %). Moreover, for good, medium, poor income were 11 (12.6 %), 48 (55.2 %) and 28 (32.2 %) respectively. In addition, the prevalence for 2-5, 5-10 and above 10 members of family were 6 (6.9 %), 26 (29.9 %) and 55 (63.2 %) respectively. Additionally, the association of *H. pylori* infection with hygienic and unhygienic condition was (31 %) and (69 %). Furthermore, the specific prevalence for pipe was 6 (6.9 %), well 63 (42.4 %), Tank 12 (13.8 %), stream 4 (4.6 %) and River water 2 (2.3 %). Remarkably, most of the patients have epigastric pain as well as diabetes and blood group have positive relationship with *H. pylori* infection, but there was no association with BMI categories.

Conclusion: Prevalence of *H. pylori* infection was associated with age, marital status, hand washing, family income, living place, family members, drinking water, diabetes and blood group, but no association was found between infection and BMI categories.

Recommendation: The study recommend that at the health sector level, strategies must be developed to ensure health status. Medical professionals must pay attention to epigastric pain and diabetes among the clinical features of the disease. People in the community should pay attention to the use of drinking water and hygiene.

Keywords: *Adults, associated factors, H. pylori, prevalence, upper gastrointestinal tract*

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INTRODCUTION

Helicobacter *pylori* (*H. pylori*) are gram-negative, spiral-shaped bacteria and transmitted from humans to humans that colonize the human stomach, causing chronic gastritis, gastric malignancy and peptic ulcer disease, which have been recognized as a major public health concern all over the world [1]. Since 1994, the International Agency for Research on Cancer has classified *H. pylori* as a Group 1 carcinogenic pathogen. Infection with *H. pylori* is considered central risk factor for gastric cancer in both the Western and Eastern countries that affects up to 50% of the population worldwide, with a higher prevalence in developing countries[2, 3]. Moreover, *H. pylori* is the most serious cause for chronic or atrophic gastritis, peptic ulcer, gastric lymphoma, and gastric carcinoma; however, these complications are less often seen in children and adolescents compared to adults [4, 5]. Furthermore, *H. pylori* infection is common in developing countries and this germ may cause the development of gastroduodenal diseases, ranging from gastritis to gastric cancer [6]. Approximately 13% to 81% of people have *H pylori* infection [7].

Prevalence of the bacterium varies according to age, region, race, and socioeconomic class [8]. Previous studies have suggested *H. pylori* to be positively associated with diabetes mellitus [9]. However, other studies found no association between them [10]. Various Factors including age, gender, education, lifestyle, health condition, number of family members and financial status as well as area of residence could affect the prevalence of *H. pylori* in the population. However, the correlation between these factors and *H. pylori* infection is inconclusive [8, 11]. Also, the other potential risk factors, including occupational risk factors, water supply, and food were analyzed, as well as gastroesophageal reflux and sexual partners have been associated with a higher risk for *H. pylori* acquisition. Gut microbiota was suggested to play a role in interfamilial transmission of *H. pylori* [12, 13]. Therefore, the prevalence and associated risk factors of *H. pylori* still unclear among patient's complaint upper gastrointestinal tract symptoms, who were referred to Spinghar Momand curative and teaching Hospital, Jalalabad city.

MATERIALS AND METHODS

Study Population

A total of 122 patients in the Spinghar Momand Curative and Teaching Hospital Jalalabad city were selected. In this research the data used from an analytical cross-sectional study, which was conducted in the Spinghar Momand Curative and Teaching Hospital and Jalalabad city, Nangarhar Province, Afghanistan. Participants aged > 18 years who had a health check-up in the hospital during September 2022 and January 2023. The health check-up data included demographic characteristics, the stool antigen tests, and information on medical histories. The contents of the questionnaire involved the information on demographic and socio-economic factors (including age, sex, education level, house hold income, number of family members, usage of water, body weight, diabetes, BMI and blood group), self-reported medical history. SPSS software version 23.0 was used for all statistical analysis. The categorical data were expressed as frequencies and percentages. Chi-square tests for trend were used to analyze the associations between study variables and *H. pylori* infection. Only variables with a P= 0.05 were considered to be significantly associated with *H. pylori* infection.

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RESULTS

Social Demographic Distribution among Patients Complaint upper Gastrointestinal Tract Symptoms'

A total of 122 patients were enrolled and the overall prevalence of *H. pylori* positivity rate was 87 (71.3 %). Females 47 (54 %) had a higher positivity rate of *H. pylori* than males 40 (46 %). The prevalence of *H. pylori* was non-significantly ($\chi 2$ = 87, P= 0.25) associated with gender as shown in Figure 1. Moreover, Age specific prevalence for 18-25 years was 32 (26.2 %), 25-50 years was 69 (56.6 %) and above 50 years old 21 (17.2 %). The highest positivity rate was observed in 25-50 year-age-group, which was 69 (56.6 %), although there was significant association among age groups ($\chi 2$= 173.9, P=0.04) as shown in Figure 2. Furthermore, the prevalence in urban residents was 24 (28 %) and 63 (72.4 %) for rural area. The highest positivity rate was observed in rural residents as shown in Figure 3. Additionally, the prevalence of *H. pylori* positivity rate was 67 (77 %) in married and 20 (23 %) was in unmarried patients subjected to *H. pylori* infection as depicted in Figure 4.

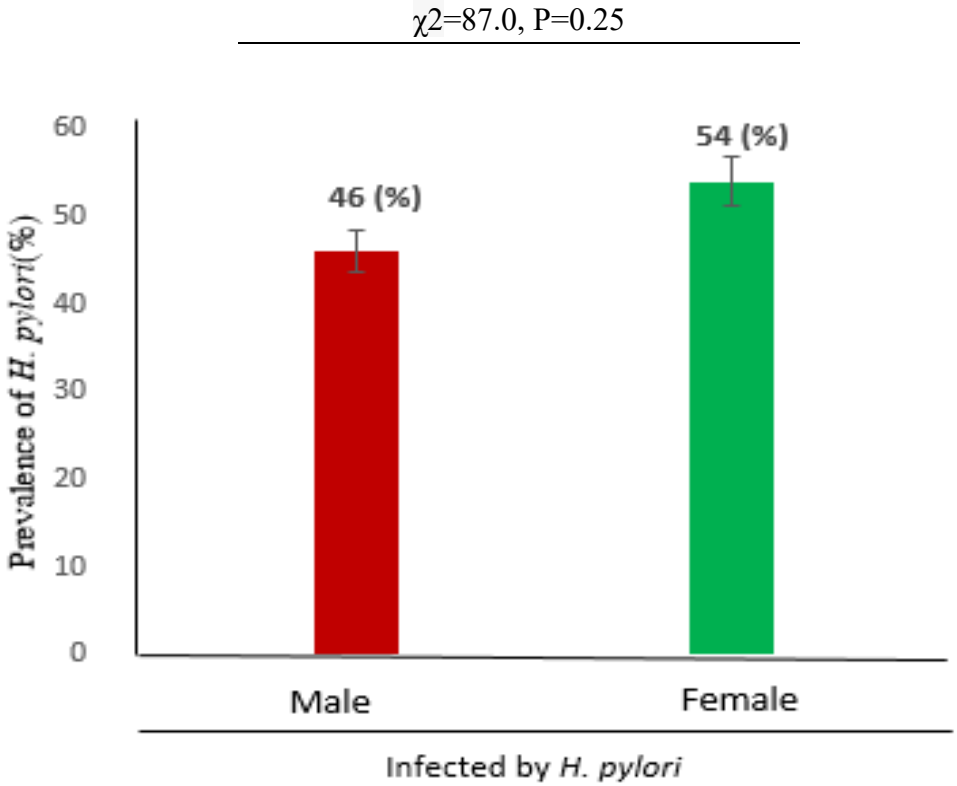

Figure 1: Demographic features of participants with *H. pylori* infection.

According to Figure 1, the positivity rate of *H. pylori* infection was higher in female compared to male among patients' complaint upper gastrointestinal tract symptoms, which were referred to Spinghar Momand Curative and Teaching Hospital Jalalabad.

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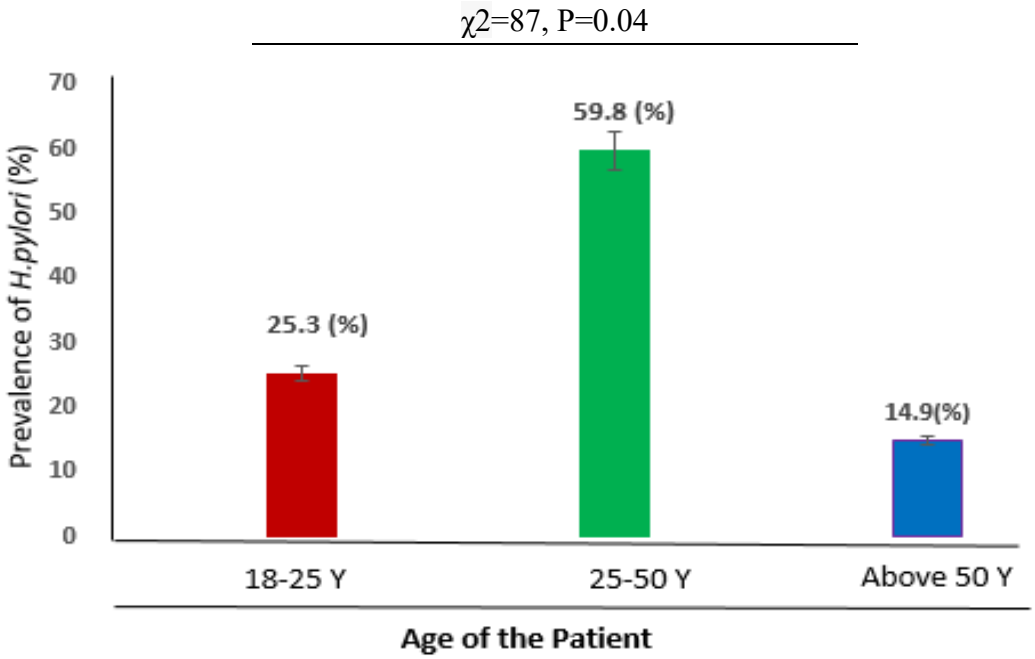

Figure 2: Prevalence of *H. pylori* according the age of the patients subjected with *H. pylori* infection.

The highest positivity rate was observed in 25-50 year-age-group, which was 69 (56.6 %) compared to other groups, referred to Spinghar Momand curative and Teaching Hospital Jalalabad.

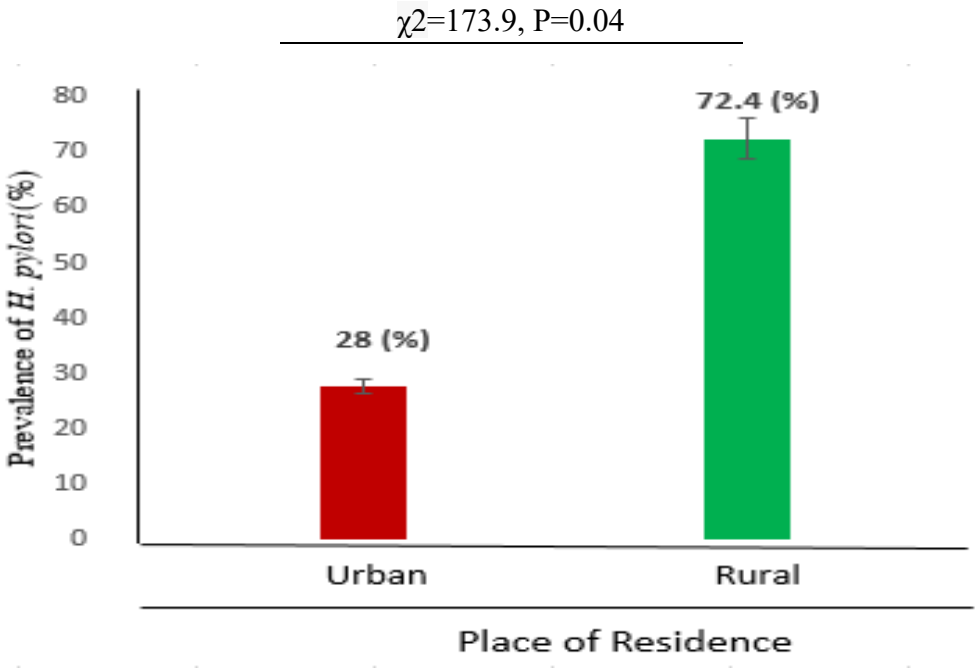

Figure 3: Prevelance of *H. pylori* according the place of residence of the patient subjected to *H. pylori* infection.

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The positivity rate of *H. pylori* infection was higher in rural compared to urban area among patients' complaint upper gastrointestinal tract symptoms, which were referred to Spinghar Momand Curative and Teaching Hospital Jalalabad.

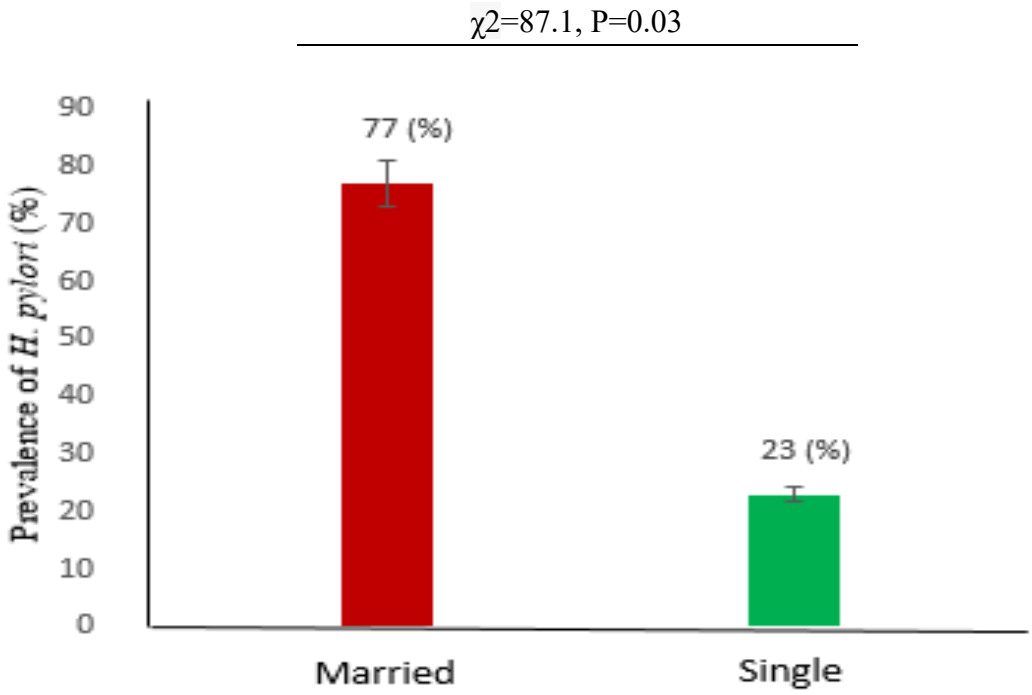

Figure 4: Prevelance of *H. pylori* accoriding to the marital status of the patient subjected to *H. pylori* infection.

The positivity rate of *H. pylori* infection was higher in married compared to single, among patients' complaint upper gastrointestinal tract symptoms, who referred to Spinghar Momand Curative and Teaching Hospital Jalalabad.

Associated Factors of Helicobacter Pylori Infection

The economic status specifically prevalence for good, medium and poor income were 11 (12.6 %), 48 (55.2 %) and 28 (32.2 %) respectively. The highest positivity rate was observed in medium-income-group 48 (55.2 %) as compared to other groups as shown in Figure 5. Moreover, the prevalence for 2-5, 5-10, and above 10 number of family members were 6 (6.9 %), 26 (29.9 %) and 55 (63.2 %) respectively. The highest positivity rate was observed in family that above 10 family members as compared to other groups as indicated in Table 1. Additionally, the association of *H. pylori* infection with hand washing, (31 %) in people who washed their hands and (69 %) was in people that did not wash their hands after toilet. The highest infected rate was observed in people, who did not wash their hands after toilet as shown in Figure 6. Furthermore, the specific prevalence for pipe, well, Tank, stream and River water were 6 (6.9 %), 63 (42.4 %), 12 (13.8 %), 4 (4.6 %), and 2 (2.3 %) respectively. The highest positivity rate was observed in well-drinking-water group 63 (42.4 %) as compared to other groups as indicated in Figure 7.

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$\chi 2$=173.9, P=0.04

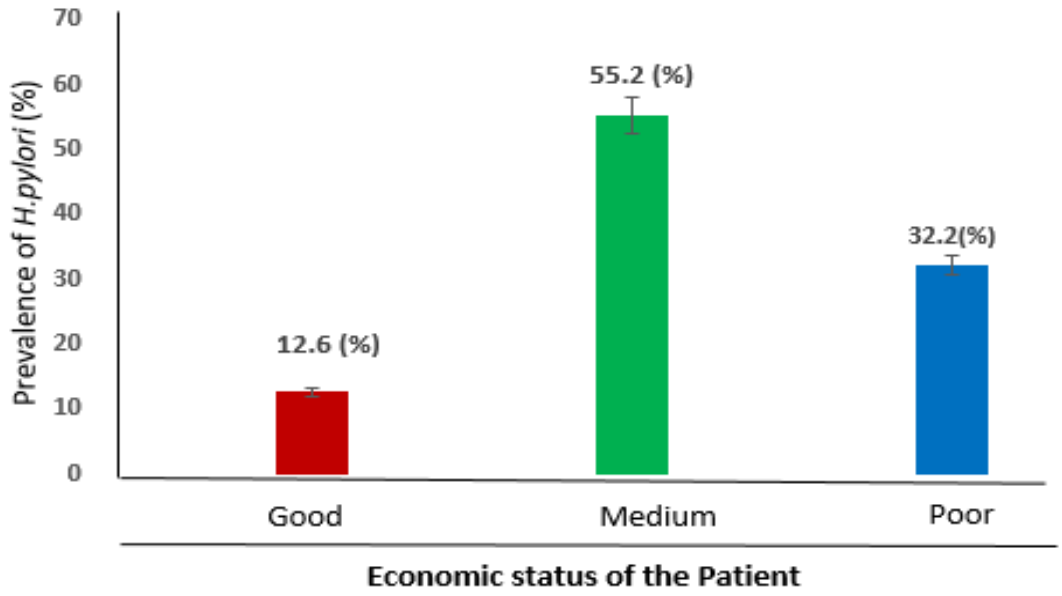

Figure 5: Prevelance of *H. pylori* according the ecnomic status of the patient subjected to *H. pylori* infection.

The highest positivity rate was observed in medium economic status group 48 (55.2 %) as compared to other groups.

Table 1: Prevalence of *H. pylori* in respect to the number of family members

Family Members	Frequency	Percent	Valid Percent	P-Value
2-5 members	6	6.9	6.9	
5-10 members	26	29.9	29.9	
Above 10 members	55	63.2	63.2	0.05

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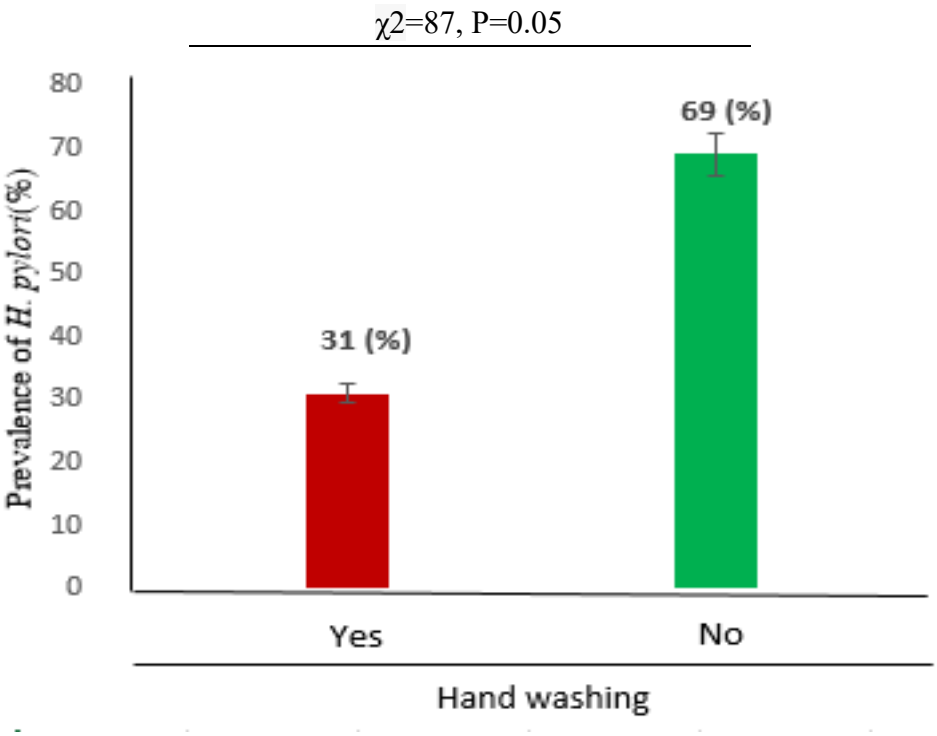

Figure 6: Prevelance of *H. pylori* vis-a-vis hand washing of the patients subjected to *H. pylori* infection.

The highest rate of infection was observed in people who did not wash their hands after toilet.

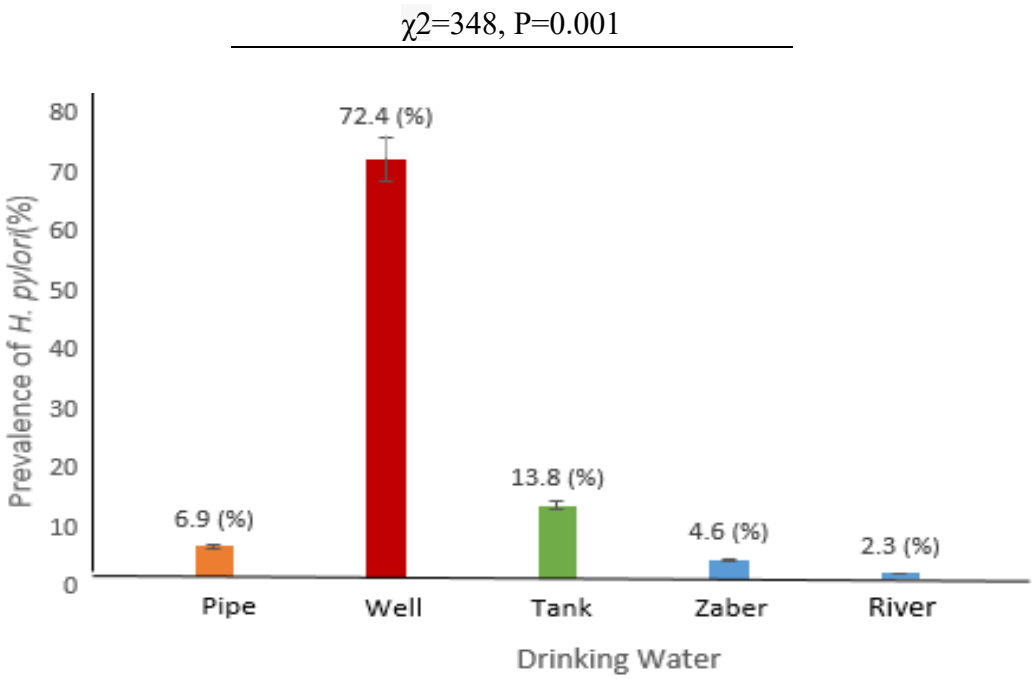

Figure 8: Prevelance *of H. pylori* accoriding the drinking water.

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The highest positivity rate was observed in well drinking water group 63 (42.4 %) as compared to other groups, who were referred to Spinghar Momand Curative and Teaching Hospital, complaint upper gastrointestinal tract symptoms.

Clinical characteristics, diabetes, BMI and blood group among *H. pylori* infected patients' complaint upper gastrointestinal tract symptoms

The clinical profile specific prevalence for epigastric pain, nausea, vomiting and heart burn were 72 (82.8 %), 9 (10.3 %), 3 (3.4 %) and 3 (3.4 %) respectively as shown in Figure 9. As well as, the prevalence for underweight, normal, over-weight, and obese categories were 2 (2.3 %), 58 (66.7 %), 16 (18.4 %) and 11 (12.6 %) respectively. Prevalence according to BMI categories did not show significant difference among all categories as indicated in Figure 11. The diabetic people prevalence with *H. pylori* was 77 (88. 5 %) and 10 (11.5 %) was in non-diabetic people. The results showed that the prevalence had higher in people who have diabetes disease. The prevalence of *H. pylori* was significantly ($p<0.05$) associated with diabetes as depicted in Figure 10. The highest prevalence of *H. pylori* infection was detected in people who have positive (+O) blood group as compared to other blood group. The blood group has significantly ($\chi2= 434.9$, $P=0.05$) association with *H. pylori* as shown in Table 2.

$\chi2=261.0$, $P=0.01$

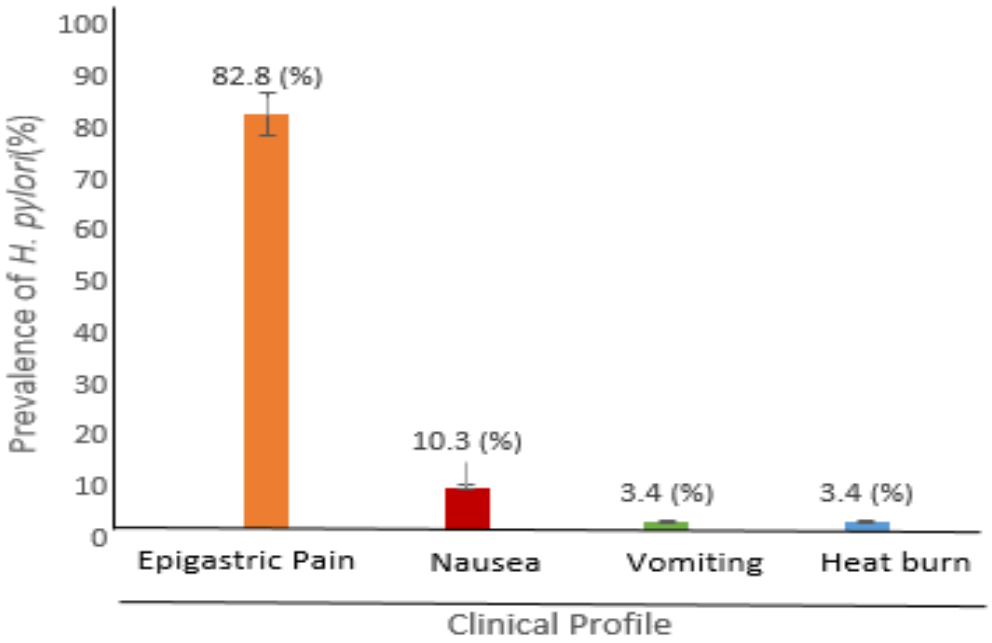

Figure 9: Prevalence of *H. pylori* according the clinical profile of the patient subjected to *H. pylori* infection.

The highest rate of clinical signs was epigastric pain, among patients complaint upper gastrointestinal tract symptoms, who were referred to Spinghar Momand Curative and Teaching Hospital Jalalabad.

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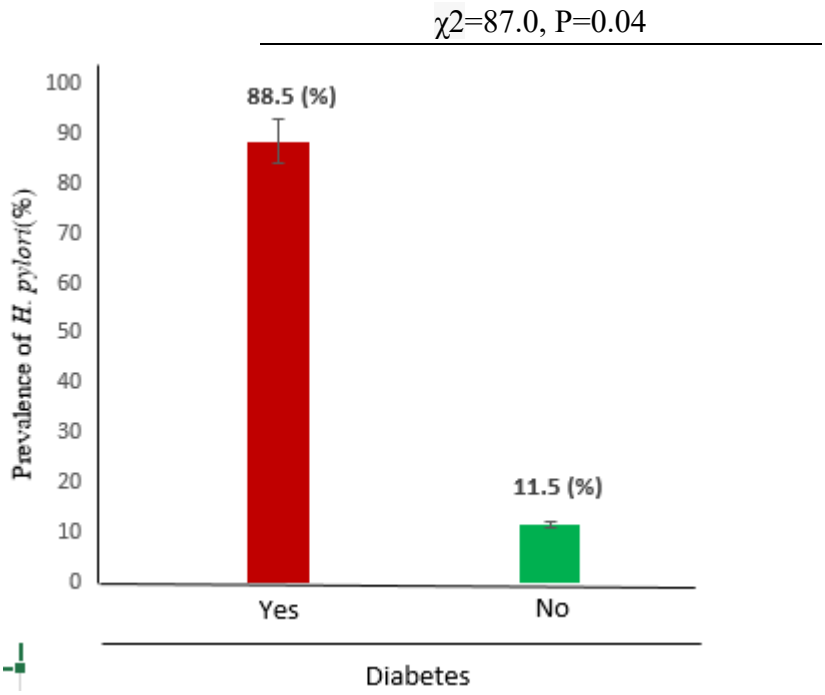

Figure 10: Prevelance of *H. pylori* infection in diabetic people.

The results showed that the prevalence was higher in people who have diabetes disease as well as the prevalence of *H. pylori* was associated with diabetes.

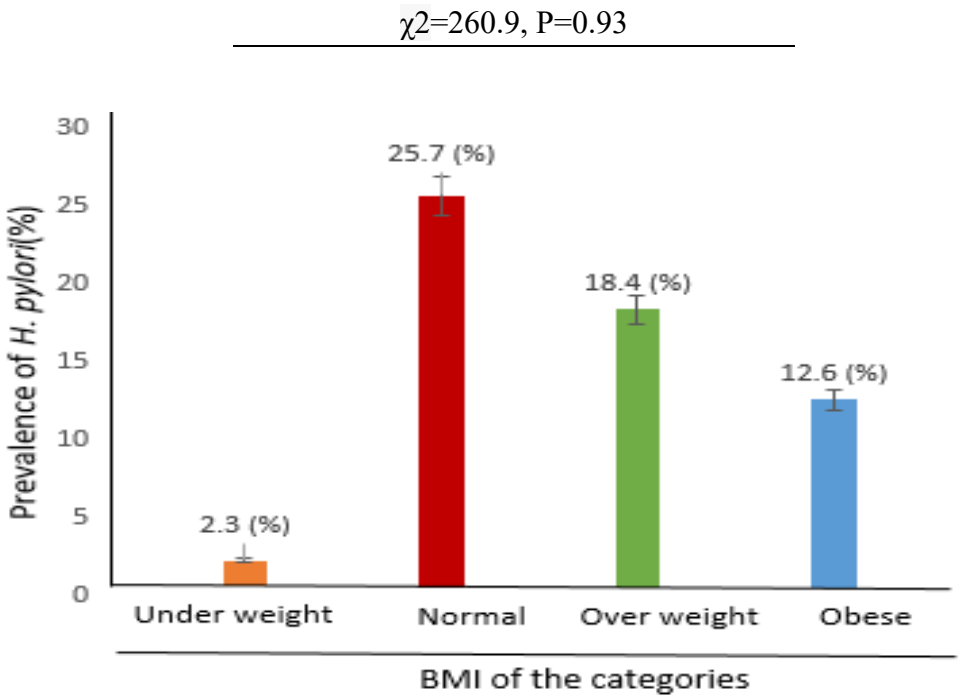

Figure 11: Prevalence of *H. pylori* according BMI categories of the patient subjected to *H. pylori* infection.

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Prevalence according to BMI did not show significant difference among different BMI categories.

Table 2: Prevalence of *H. pylori* according the blood group of the patients

Blood Group	Frequency	Percent	Valid Percent	P-value
+ O	31	35.6	35.6	0.05
+ A	19	21.8	21.8	
+ B	23	26.4	26.4	
+ AB	6	6.9	6.9	
- O	4	4.6	4.6	
A	4	4.6	4.6	

DISCUSSION

H. pylori infection remains a major global public health issue and is more prevalent in developing countries, as the incidences of gastric cancer in Kazakhstan are high and rank at the third-place from all cancers [14]. Therefore, a high prevalence of *H. pylori* infection was expected. The idea is supported by this study's results showing that the overall prevalence of *H. Pylori* infection in the study population was 71.3%. However, previous studies have demonstrated even higher infection rate: the overall prevalence of *H. pylori* seropositivity in 2010 among asymptomatic adults was 86% and 64% among children [15], while in symptomatic population *H. pylori* infection was found to be 62% in 2002 [16]. Nevertheless, the prevalence of infection in Kazakhstan was higher than in the neighboring countries: the latest data showed that the prevalence of *H. pylori* infection in Kyrgyzstan was 51, 9% [17], in China 52, 2% [18], and in Russia 53% [19]. Higher infection rate has been reported only in Uzbekistan, where the prevalence of *H. pylori* infection was 74.9% [20].

The prevalence of *H. pylori* infection was higher in female as compared to male. Therefore, close contact with family members increases the chance of *H. pylori* infection. This study's finding was consistent with the finding of the [21]. Also, Malcolm et al, Reported that the *H. pylori* infection was associated with age, sex, and socioeconomic conditions [22]. However, our study revealed that there was association between the *H. pylori* infection and sex. The prevalence of *H. pylori* was higher in people living in rural areas as compared to urban because urban residents have been employed by government or enterprises, so they have relatively higher levels of education and socioeconomic status and better sanitary conditions, which may be the lower prevalence of *H. pylori* infection. This finding was consistent with [21].

Age was previously shown to have an effect on the prevalence of *H. pylori* infection, with lower rates in subjects younger than 20 years old [23, 24]. However, in the current study, the lowest prevalence was found in the above 50 year-age-group and the highest prevalence in the 25–50 year-age-group. The prevalence did not show an ascending trend with age. One possible explanation is that subjects in the 25–50 year-age-group always tend to dine out, which increases the chance of exposure to *H. pylori*, consistent with the study by [25]. This study indicated that prevalence rose with increase in family income. Descriptive statistics analysis also revealed that family income was an important risk factor of *H. pylori* infection. This result is consistent with

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that of a previous report [26]. One possible explanation is that individuals with higher income tend to dine out, which increases the probability of *H. pylori* infection.

Previous studies showed that living conditions were potential predictors of the infection [23]. In the present study, living condition as indicated by living space was associated with higher *H. pylori* infection, especially in subjects with a per capita living space smaller than 20 m^2. *H. pylori* can be contracted through direct or indirect transmission [27, 28]. Direct transmission involves person-to-person interaction, while indirect transmission is mainly through exposure to contaminated food or water [27, 28]. Therefore, close personal contact as well as a greater number of family members in a crowded living space can increase the chance of *H. pylori* infection. In this study, there was a positive association of diabetes mellitus and *H. pylori* infection, it was observed that diabetes mellitus was related to an increased risk of *H. pylori* infection. Results from previous studies on the association between *H. pylori* infection and diabetes mellitus were controversial [9, 21]. Furthermore, these findings suggested that *H. pylori* infection was associated with type 2 diabetes in a middle-age and old-age Chinese population [29].

The routes of *H. pylori* transmission include direct and indirect transmission. Direct transmission involves person to person interaction, while indirect transmission requires means such as air, water, food, flies, and other animals [30]. As it has been reported that many diseases can be transmitted through contaminated water, a waterborne route is a plausible mode of *H. pylori* infection [31]. This is also supported by several studies which have demonstrated that *H. pylori* can survive in water for longer periods of time and that different prevalence is related to different sources of drinking water [32]. However, in our study, association was found between *H. pylori* infection and the source of drinking water. This is because most people used the different sources of drinking water (from river, tank, pipe and wells), the prevalence of *H. pylori* was higher in well drinking water compared to other type of drinking water.

The finding also showed that O positive blood group was associated with higher *H. pylori* infection rate. *H. pylori* infection rate was 35.6 % in O positive blood group patients compared with other blood groups as summarized in Table 2. Previous studies suggested that O positive blood group have a higher incidence of developing duodenal and gastric ulcers [33, 34]. This increase in the development of the disease in the O positive blood group individuals may be due to a great colonization of their epithelial cells and higher inflammatory responses to *H. pylori* [35]. In contrast to other reports, our results showed no significant differences in the prevalence rates of *H. pylori* among different BMI categories. [36], reported an inverse correlation between *H. pylori* prevalence and the rate of overweight/obesity. However, other authors demonstrated positive correlation between *H. pylori* prevalence rates and overweight / obesity [37]. Therefore, the evidence of the role of *H. pylori* infection in human obesity is inconclusive and controversial [38].

In addition, epigastric pain was more frequent in children without irritable bowel syndrome than in those with (55% vs. 31%, p = .003) [39]. Moreover, the researcher reported that most of the *H. pylori* infected patients referred because of the Epigastric Pain [40]. In present study the result was in lined with the previous study because the epigastric pain in upper gastrointestinal tract was also the most frequent symptom in (82.8 %) patients. As reported in Figure. 8, the prevalence of symptoms in our series was quite high, as half of our population showed at least one symptom, with epigastric pain being present in 82.8%.

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CONCLUSION

The prevalence of *H. pylori* among the sample population is high in those who have low income, using well water for drinking, having O positive blood group, female sex, 25 to 50 years old, married and in those who don't wash hands after using toilet. Additionally, epigastric pain was existing in most of our study population infected by *H. pylori* infection.

RECOMMENDATIONS

Socio-economic status plays a role in the occurrence of disease, so at the level of health sector, strategy must be made to ensure the health status. Medical professionals should definitely pay attention to epigastric pain and diabetes in the clinical profile of the disease. The community people should be pay attention to the use of drinking water and hygiene. Finally, patients should not self-medicate for stomach pain and be truthful in their history.

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Funding Declaration

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Conflicts of Interest

The authors declare no conflict of interest

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