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## Prevalence of *Helicobacter Pylori* (*H. Pylori*) Infection among Patients Undergoing Upper Gastrointestinal Endoscopy: An Institution Based Study

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### ABSTRACT

Several studies have established region-based prevalence rate of *H. pylori* infection and its association with clinical outcomes in Bhutan. However, this study attempts to determine hospital-based prevalence rate of *H. pylori* and its association with clinical outcomes. A total of 347 volunteers (159 females and 188 males; mean age of  $49.8 \pm 15.5$  years) were enrolled from Central Regional Referral Hospital (CRRH) in Gelephu. Upper gastro-intestinal endoscopy (UGIE) was performed among the dyspeptics and *H. pylori* infection was determined by Histology examination. The histological prevalence of *H. pylori* among 347 patients who went upper gastro-intestinal endoscopy was 55.6%. The prevalence of *H. pylori* infection increased with age but it was statistically insignificant ( $P > 0.05$ ). Gastritis was the most common endoscopic finding, present in 309 (89%) patients followed by normal upper endoscopy results in 24 (6.9%) patients. The prevalence of *H. pylori* among patients with gastritis and a duodenal ulcer was significantly higher than in patients with gastric cancer ( $P < 0.05$ ). The high incidence of gastritis in the hospital may be attributed to the high prevalence of *H. pylori* infection among the individuals with dyspepsia.

### INTRODUCTION

*Helicobacter pylori* infection is well known to be the most common human infection affecting more than 50% of the world's population (Salih, B.A. (2009). There is a variation in the prevalence of infection between different countries and, among different societies and ethnic groups within the same country (Van D. *et al.* 2009; Kaur *et al.* 2003; Malaty *et al.* 1996). Chronic infection with *H. pylori* is typically acquired early in life, especially among those in poor socio-economic status and over-crowded conditions (Bardhan PK, 1997; McColl KE 2010).

Bhutan is a small country with an estimated population of 8, 00,000. The incidence of gastric cancer in Bhutan is reported to be quite high (with 24.2 cases per 100,000 populations per years) as compared to other neighboring countries like Thailand, India and Bangladesh (Shiota *et al.* 2013; Dendup *et al.* 2015). The previous studies have showed association of high incidence of gastric cancer with high prevalence of *H. pylori* among Bhutanese population (Dorji *et al.* 2014; Vilaichone *et al.* 2013). However, there has not been a study conducted as to determine the hospital-based prevalence rate of *H. pylori* infection and its association with clinical outcomes among the patients regularly visiting the concerned hospital. *Helicobacter pylori* infection is quite rampant in Bhutan at 66.2%. Punakha district disclosed the highest prevalence of *H. pylori* infection (85.6%), followed by Wangduephodrang district (75.4%), while Haa had the lowest prevalence (57.7%) (18). The reason why Haa and other districts had lower prevalence could be due to low residing population and seasonal migration during summer and winter months (Ratha-korn *et al.* 2020).

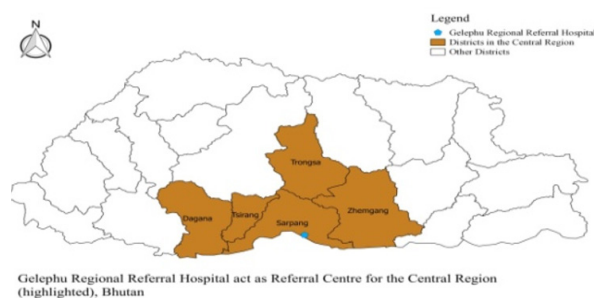
Therefore, we conducted a retrospective hospital-based

study over two years (August 2014 to December 2016) to determine the prevalence of *H. pylori* infection among the dyspeptic patients visiting CRRH and to assess association among clinical outcomes, gender and age with *H. pylori* infection.

### METHODS

Gelephu is one of the sub-districts located in the Southern part of Bhutan. The region shares border with India. The Central Regional Referral Hospital (CRRH), located in Gelephu, provides healthcare services to the local people residing in Sarpang district, as well as to those patients referred from four other districts which include Trongsa, Tsirang, Dagana and Zhemgang within the Central Region. Patients are referred to CRRH to avail endoscopy service from all five districts as the district hospitals lack such facility.

This was a cross-sectional study was carried out among Bhutanese population who attended CRRH between August 2014 and December 2016. The study population included individuals who had undergone UGIE for



**Figure 1:** Central Regional Referral Hospital, Bhutan

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evaluation of dyspeptic symptoms. The information on age, gender, biopsy report and presence or absence of *H. pylori* infection was reviewed from the medical record maintained in the outpatient registry. Subjects with age below 14 years were excluded from the study. This study was approved by Research Ethics Board of Health (REBH), Ministry of Health.

### Procedure for Endoscopy and Histology

Endoscopy was performed after an overnight fasting of the patients. Scope was inserted through the mouth after lignocaine spray in the throat to make the pharynx numb. Detailed examination of esophagus, stomach and upper part of duodenum was performed. Gastric biopsies were taken randomly from at least two sites. All biopsies were fixed in formalin prior to shipment to Pathology laboratory in Thimphu for Hematoxylin and Eosin (H & E) staining.

### Statistical Analysis

Frequency and percentage were used to describe the characteristics of the study population. The prevalence of *H. pylori* infection was presented in terms of percentage (%) and Z-test was used to assess whether this prevalence was significantly different from the prevalence of previous studies. The association between age and gender with *H. pylori* infection was analyzed using Pearson Chi-Square. P value less than 0.05 was considered statistically significant in this study.

## RESULTS

### Endoscopic Findings and Prevalence of *H. Pylori* infection

A total of 347 subjects were enrolled for the study of which, 159 (45.82%) were females and 188 (54.18%) were males. The mean age of the study population was  $49.8 \pm 15.5$  years (range: 15 – 83 years). The most common endoscopic finding among the patients with dyspepsia was gastritis (309, 89.05%), followed by normal endoscopy results (24, 6.9%). Gastric cancer, duodenal ulcer and gastric ulcer were less common, present only in eight patients (2.31%), five (1.44%) and, one (0.29%) respectively.

A study subject was considered *H. pylori* positive when the biopsy specimen showed positive in H & E staining. The overall prevalence of *H. pylori* among the study subjects was 55.6% (95% CI: 50.367 – 60.873). We also tested whether the prevalence in this study was significantly different from previous studies using Z-test ( $H_a: p < 86\%$  and  $H_a: p < 73.4\%$ ). The prevalence of *H. pylori* infection among the study population in CRRH was significantly lower as compared to previous prevalence of *H. pylori* infection found in other Regions ( $p < 0.001$ ).

### Association of *H. Pylori* Infection with Age and Gender

109 (57.98%) of the males were *H. pylori* positive as compared to 84 (52.83%) of the females. In our study, older patients were more likely to be *H. pylori* positive than the younger ones. The positivity of *H. pylori* was

**Table 1:** Association of *H. pylori* infection with age and gender.

| Characteristics | Total number (n) | <i>H. pylori</i> |              | P-value            |
|-----------------|------------------|------------------|--------------|--------------------|
|                 |                  | Positive (%)     | Negative (%) |                    |
| Gender          |                  |                  |              |                    |
| Male            | 188              | 109(57.98)       | 79 (42.02)   | 0.336 <sup>#</sup> |
| Female          | 159              | 84 (52.83)       | 75 (47.17)   |                    |
| Age             |                  |                  |              |                    |
| 15 - 29         | 38               | 19 (9.87)        | 19 (12.34)   | 0.124 <sup>#</sup> |
| 30 - 39         | 62               | 38 (19.69)       | 24 (15.58)   |                    |
| 40 - 49         | 63               | 42 (21.76)       | 21 (13.64)   |                    |
| 50 - 59         | 71               | 40 (20.73)       | 31 (21.13)   |                    |
| > 60            | 113              | 54 (27.98)       | 59 (38.31)   |                    |

observed highest among subjects with age higher than 60 years (27.98%) followed by 40-49 years (21.76%) and 50-59 years (20.73%). 15-29 years subjects had the least *H. pylori* infection with 9.87%. However, there was no statistically significant association of *H. pylori* infection with both gender and age ( $p > 0.05$ ) (Table 1).

### Association between *H. pylori* infection and clinical outcomes

The clinical presentations of the subjects were considered for assessing the association with *H. pylori* infection (Table 2). Patients with gastritis are more likely to have *H. pylori* infection (61.8%) than those without it (38.2%;  $p <$

**Table 2:** Association between *H. pylori* infection and clinical findings.

| Clinical Findings | Total number (%) | <i>H. pylori</i> |              | P-value        |
|-------------------|------------------|------------------|--------------|----------------|
|                   |                  | Positive (%)     | Negative (%) |                |
| Gastritis         | 309 (89.0)       | 191 (61.8)       | 118 (38.2)   | $< 0.001^{\#}$ |
| Gastric ulcer     | 5 (1.4)          | 1 (20.0)         | 4 (80.0)     | $< 0.001^*$    |

|                |          |          |            |                      |
|----------------|----------|----------|------------|----------------------|
| Duodenal ulcer | 1 (0.3)  | 0 (0.0)  | 1 (100.0)  | 0.444*               |
| Gastric cancer | 8 (2.3)  | 1 (12.5) | 7 (87.5)   | 0.030*               |
| Normal         | 24 (6.9) | 0 (0.0)  | 24 (100.0) | < 0.001 <sup>#</sup> |

0.001). In contrary, cases with gastric ulcer, gastric cancer and normal endoscopic findings are less likely to have *H. pylori* infection ( $p < 0.05$ ).

## DISCUSSION

This study was endoscopy-based and histological examination was performed to detect *H. pylori* among patients with dyspepsia. The study revealed high prevalence rate of *H. pylori* 55.6% among Bhutanese population with dyspepsia. This is in contrast to the previous studies conducted by Vilaichone *et al* 2014; Dorji *et al.* 2013) in Bhutan where the prevalence rates ranging from 73.4% to as high as 96% were found among Bhutanese population residing in different districts and regions with dyspepsia. The lower prevalence rate of *H. pylori*, as revealed by our study compared to the previous studies, possibly could have been due to the sensitivity of histological detection, which was the only method of detection used in this study. The sensitivity of this method depends not only on density of *H. pylori* biopsy sites but also on expertise of pathologists (el-Zimaity HM, 2000). Many studies have showed several factors such as age of patient, socio-cultural practices, living conditions, environment and geographic location play important roles in *H. pylori* infection in different population. Therefore, one of the factors contributing to the lower prevalence of *H. pylori*, as compared to the previous studies, could also be due to the location of the hospital, Southern part of Bhutan where socio-cultural practices are different from the mainstream Bhutanese tradition and cultural practices. The same study conducted by Dorji and his colleagues has revealed the similar trend in the prevalence of *H. pylori* in Southern Bhutan compared to Western and Central regions. However, it is difficult to compare the *H. pylori* detection rate since different studies have used different methods. Dorji *et al* has used serology to determine IgG antibody against *H. pylori* which does not differentiate past and present infection, therefore, this could have also contributed in higher prevalence rate than this study.

Although there is no significant difference in prevalence of *H. pylori* among the age groups, there is an increasing trend in prevalence with increase in age groups, which is in contrast to the previous studies. The similar trend has also been seen in other studies conducted by (Rodrigo *et al* 1997; Koch *et al* 2005) in Spain and Greenland respectively.

The most common cause of dyspepsia was found to be gastritis through histological examination which was in concurrence with endoscopic results. Furthermore, this study showed that 61.8% of patients with gastritis had *H. pylori* infection and this is in consistent with other studies conducted in Nigeria (Jemilohun *et al.* 2010; Ndububa *et*

*al.* 2001). Unlike other studies, this study showed gastric and duodenal ulcers have lesser association with *H. pylori* compared to gastritis which was comparable with the study conducted by Olubuyide and his colleagues in Nigeria (Olubuyide *et al.* 1989).

One of the key limitations of this study is that it was hospital-based setting and may not be a true representation of the prevalence of *H. pylori* among dyspeptics in the general population of the Central region of Bhutan. Further, the study was carried out only in one centre, therefore, this study calls for a community-based which would be more representative. Also since this study was also a retrospective cohort study, data collection was limited to the information available in hospital records. The records did not include information on risk factors for *H. pylori* infection such as social, economic and other determinants.

## Conflict of Interest

There is no conflict of interest among authors

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## CONCLUSION

In conclusion, this study found high prevalence of *H. pylori* infection in concurrence and comparable with other developing countries. Also, there is a strong association between gastritis and *H. Pylori* infection which suggests treatment of *H. pylori* infection may be a priority choice while managing gastritis in the hospital set up.

## Limitation of The Study

Some of the limitations were: only ambulant population who visited the hospital for UGIE were performed endoscopy. Other patients from other districts who were not referred to the Gelephu Regional Referral hospital were missed. Moreover, patients refusing or not consenting for UGIE were also missed for the procedures.

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