C. Detection of Oral Helicopter Pylori among Government Employee

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Helicobacter Pylori ***(H. pylori)*** is a Gram-negative and microaerophilic bacterium mainly colonizes the gastric mucosa and also detected in different niches of oral cavity [1,2]. Affecting 20-50% of people in industrialized nations and up to 80% of people in developing countries. *H. pylori* infection has been a worldwide threat to human health.

Considering oral cavity is an extra gastric reservoir for *H. pylori* and may be source of infection, re-infection and transmission [3], researchers also made efforts to explore the association between *H. pylori* infection and oral diseases. High prevalence of oral *H. pylori* was detected in patients with periodontitis, poor periodontal health characterized by advanced periodontal pockets, as well as the present of plaque and gingival bleeding [4]. *H. pylori* DNA could be found in separate oral mucosal ulcers in apparently immunocompetent adults [5]. A retrospective study also suggested that *H. pylori*-infected children had an increased risk of dental caries [6].

Scientists suspect that *H. pylori* infection may be contagious because the infection seems to run in families and is more common where people live in crowded or unsanitary conditions [7]. Although research suggests that infection is passed from oral to oral, exactly how this happens isn't really known.

Because the majority of physicians and scientists in this field ignore the colonized cavities of *H. pylori,* approximately 20% of the population of Asia suffers from oral *H. pylori* infection [3]. In China alone, more than 280 million people carry oral *H. pylori,* which results in 28 million recurrences of stomach *H. pylori* infection and the abuse of antibiotics by overuse [8,9]. The aim of the present study was to use rapid immune chromatographic antigen tests of saliva **(HPS)** to identify oral *H. pylori* infection of adult and prevalence rate of Oral *H. pylori* infection of adult.

MATERIALS AND METHODS

The informed consent was obtained from all participants. All individuals were recruited for annual physical examination of government employee in Beijing who had already agreed to undergo various tests for the diagnosis of their oral and stomach *H. pylori* infection. There were total 4321 individuals (age range, 20- 89 years old) comprising 2849 men and 1472 women. According the classification on age grouping of WHO, there were A. young age subgroup (<45 years); B middle age subgroup (45 to 59 years); C old age subgroup (60-74 years) and D elder subgroup (75-89 years), we listed all individual in Table 1.

Table 1: Age Distribution.

Age grouping	Average age	Men	Women
A: <45	35.7	1138	762
B: 45 -59	50.6	1332	521
C: 60-74	64.4	261	150
D: 75-89	81.4	118	39

Methods

H. pylori antigen test for oral urease (HPS):

HPS: *H. pylori* were specifically detected in saliva using a lateral flow immune chromatographic test device. The device for *H. pylori* antigen detection in saliva was identical to the urea breath test **(UBT C^{13})** used for stomach urease detection. The HPS test for saliva employed a monoclonal antibody that was developed against oral urease. Test Procedure: No food or drink was allowed 1 h prior to the test. A swab was placed under the tongue for at least 1 min. The swab was swirled vigorously for 15 s in a buffer solution, and then, we expunged as much liquid as possible from the swab by pressing and rotating the fiber portion against the wall of the tube. Next, 2-3 drops of the saliva/buffer mixture were added into the sample well. As the test begins, a purple color moves across the results window in the center of the test disk. The presence of 2 color bands ('T' band and 'C' band) within the result window indicates a positive result. The presence of only 1 purple color band indicates a negative result. Specificity: An in-house study was conducted with 3 separate lots of the HPS test to determine its specificity. The following common oral bacteria were applied:

Actinomyces naeslundii, *A. odontolyticus*, *Bifidobacterium dentium*, *Corynebacterium matruchotii*, *Gemella haemolysans*, *Granulicatella adiacens*, *Streptococcus gordonii*, *S. salivarius*, *S. sanguinis*, and *Veillonella parvula.* All the above bacteria were analyzed and did not show interference or cross-reactivity with the test. Sensitivity: The test's sensitivity was 10 ng/ml HPS antigen [1].

STATISTICAL ANALYSES

The data for each diagnostic test method were analyzed by treatment grouping and test results of HPS and UBT C^{13} sub-grouping. Positive rates **(P)** for each diagnostic test in all individuals and within each subgroup were calculated using the number of individuals with positive results divided by the total number of individuals **(N)** for all or for each subgroup. The two sided 95% Confidence Interval **(CI)** was calculated for each rate using the exact method based on the binomial distribution. Positive rates between different tests were compared using the paired chi-square test (i.e. McNemar test). A two sided p-value of <0.05 was considered significant. All analyses were performed using the Statistical Analysis Software (SAS) package [10].

RESULTS

The positive rate of Oral *H. pylori* among all groups

There were 2245 individuals have positive response of HPS that indicated the positive rated of 51.96% among total 4351 individuals. The A group has highest positive rate of 59.58% in 95% Confidence Interval **(Cl)** rage, B group has 48.52% in 95% Confidence Interval (Cl) rage, C group has 42.34% in 95% Confidence Interval (Cl) rage. The D group has lowest positive rate of HPS was 25.48% in 95% Confidence Interval (Cl) rage. See Figure 1.

Comparison between A,B and C groups there was no statistic difference (>0.05), but there was significant difference comparison A or B or C and D group (<0.001).

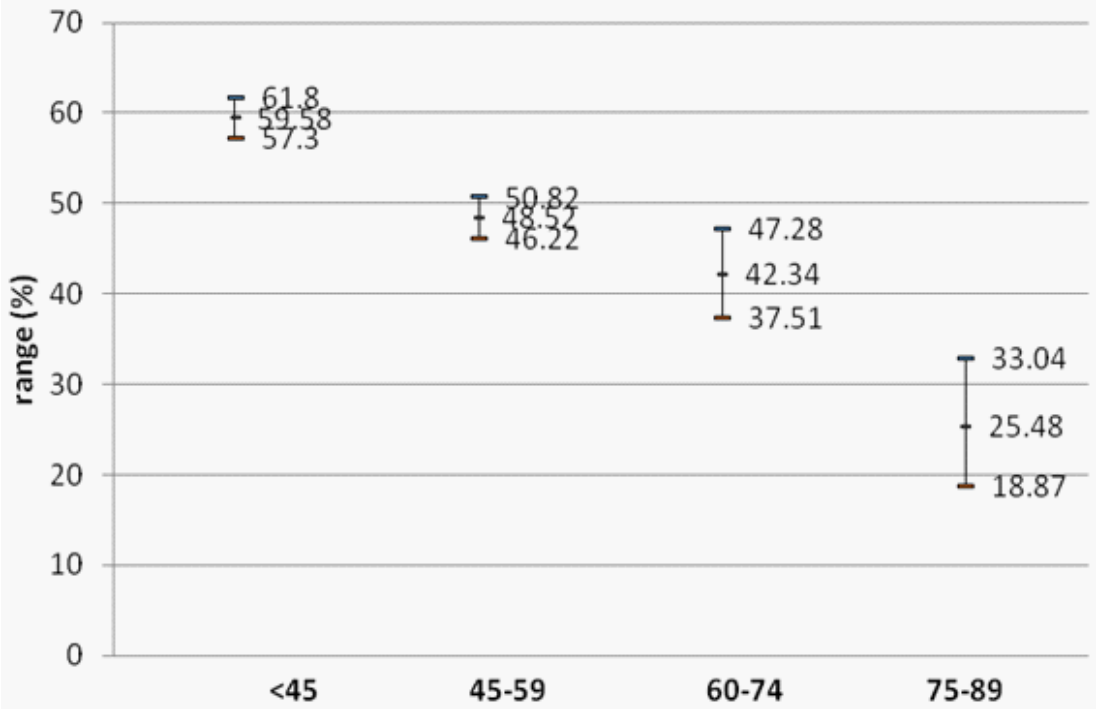

Figure 1: Positive rate of HPS among all age groups. A group I<45, B group 45-59, C group 60-75, D group 75-89.

The positive rate of Oral *H. pylori* in men among all groups

The A group has highest positive rate of oral *H. pylori* of men, then decreased gradually with each group. The D group has lowest positive rate of oral *H. pylori*. See Figure 2.

Comparison between A,B and C groups there was no statistic difference (>0.05), but there was significant difference comparison A or B or C and D group (<0.001).

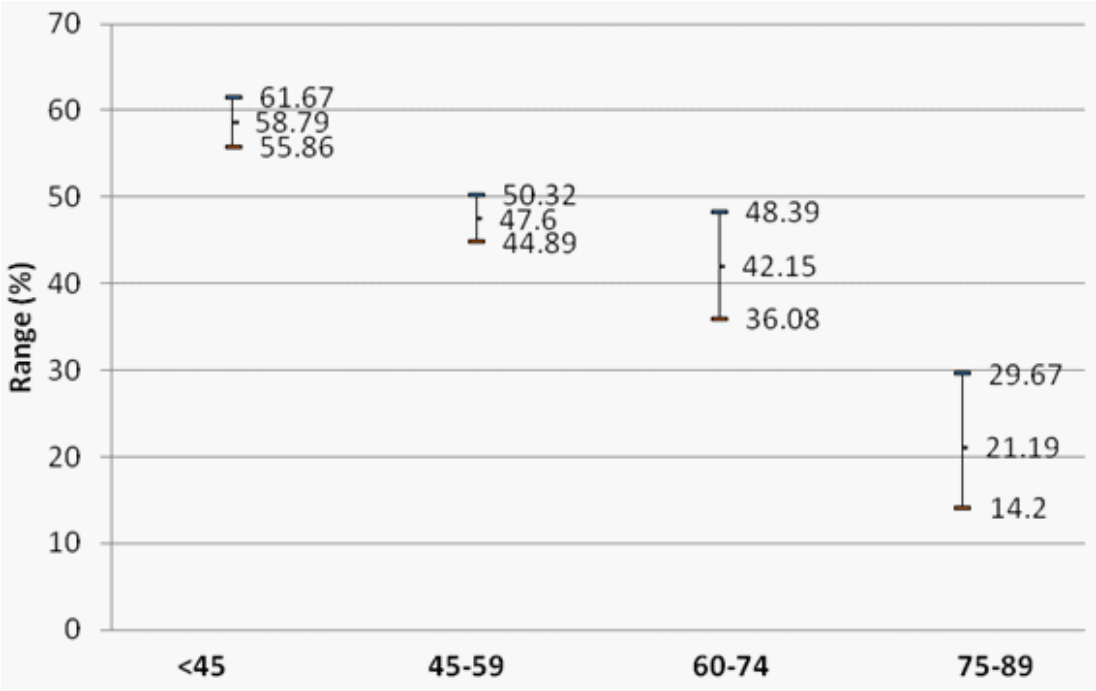

Figure 2: Positive rate of HPS of men among all age groups.

The positive rate of Oral *H. pylori* of women among all groups

The A group has highest positive rate of oral *H. pylori* of women, and then decreased gradually each group. The D group has lowest positive rate of oral *H. pylori*. See Figure 3.

Comparison between A,B and C groups there was no statistic difference (>0.05), but there was significant difference comparison A or B or C and D group (<0.001).

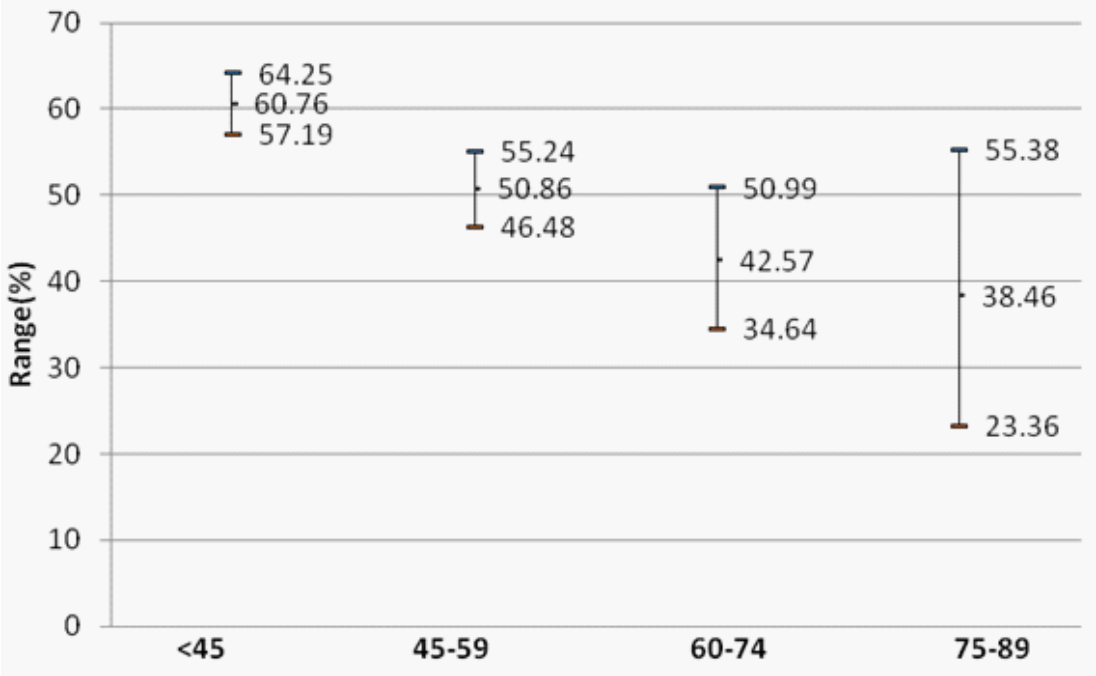

Figure 3: Positive rate of HPS of women among all age groups.

DISCUSSION

Tsami A *et al*. detected *H. pylori* in subgingival dental plaque of children and their family [11]. Several reports have indicated that *H. pylori* colonies could be grown only from root canals but not from plaque. The root canals of endodontic-infected teeth could be a reservoir for live *H. pylori* that could serve as a potential source of transmission [12,13]. It is very interesting that we found lowest positive or oral *H pylori* infection in elder group because they in this group the number of teeth were lowest.

Dye BA *et al.* report that a total of 4504 participants who completed a periodontal examination and tested positive for *H. pylori* antibodies that show periodontal pockets with a depth of 5 mm or more were associated with increased odds of *H. pylori* seropositivity (odds ratio [OR]=1.47; 95% Confidence Interval [CI]=1.12, 1.94). The conclusion was that poor periodontal health, which is characterized by advanced periodontal pockets, could be associated with *H. pylori* infection in adults [14]. Fernández-Tilapa G *et al.* found that the prevalence of *H. pylori* in the oral cavity was higher among seropositive subjects than seronegative ones [15]. Furthermore, Nisha KJ *et al*. reported that there is a highly significant association between periodontal disease and the colonization of *H. pylori* in dental plaque [16].

The Urea Breath Test (UBT)C^{13}, is a good rapid diagnostic procedure used to identify stomach infections by *H. pylori.* It is based upon the ability of *H. pylori* to convert urea to ammonia and

carbon dioxide. Urea breath tests are recommended in leading society guidelines as a preferred non-invasive choice for detecting *H. pylori* of stomach before and after treatment with diagnostic efficacy at 96.7% sensitivity and 96.2% specificity. However UBT is not a test for detection *H. pylori* in the mouth. UBT C^{13} can't detect *H. pylori* in oral cavity as a person has dysfunction of color blind. In medical practice, patients with negative results in UBT C^{13} suggest that their stomach infection of *H. pylori* is cured. In fact, patients can present negative UBT results and yet exhibit *H. pylori* infection due to oral infection. This clinical study provides evidence that *H.* pylori oral infection is nonetheless present that also showed that HPS could identify individuals who have no risk for *H. pylori* gastric but oral infection. It further identified persons with no symptoms but with antigenic evidence of possible oral *H. pylori* infection who are thus at risk for developing gastric disease. This information was not provided by UBT methods.

Drug treatment on stomach *H. pylori* infection has no effective in *H. pylori* infection of oral cavity. *H. pylori* exist in between the teeth and gums called "bio- film membrane" (Bifilm), also known as plaque barrier. It is resistance when the drug into this area. This is why conventional treatment for *H. pylori* eradication *H. pylori* infection, but is not efficacy of oral *H. pylori* in dental plaque. Miyabayashi *etc.* [17] found the eradication success rate was significantly lower in the oral *H. pylori*-positive cases (12/23, 52.1%) than in the negative cases (22/24, 91.6%) at 4 weeks after the therapy (p = 0028). Two years later, only 16 of the 23 (69.5%) oral *H. pylori*-positive cases were disease-free, as compared to 23 of the 24 (95.8%) oral *H. pylori*-negative cases (p =018). They concluded *H. pylori* in the oral cavity affected the outcome of eradication therapy and was associated with a recurrence of gastric infection and recommend that oral *H. pylori* should be examined by nested PCR and, if positive, should be considered a causal factor in refractory or recurrent cases. Several studies show the efficacy rate of treatment on stomach *H. pylori* infection at 82.26% for patients received treatment of mouthwash combined with drug eradication; but only at 61.33% efficacy when patients received drug eradication on stomach. So treatment of oral cavity *H. pylori* raise about 20% efficacy when combined treatments of both mouth and stomach [2,18]. It is important we should stop oral *H. pylori* before getting further stomach infection.

CONCLUSION

1. Oral *H. pylori*. Infection exists in adult of China.

2. The prevalence of oral *H. pylori* infection is higher in young age group, but lower in elder group.

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