Prevalence and Risk Factors of Helicobacter pylori among Adults at Jinka Zonal Hospital, Debub Omo Zone, Southwest Ethiopia

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Abstract

Background: Nearly 50% of the world’s population is estimated to be infected with Helicobacter pylori, but the prevalence varies greatly among countries and population groups within the same country. The overall prevalence of Helicobacter pylori infection is strongly correlated with socioeconomic conditions.

Objective: To determine the prevalence and the possible risk factors for Helicobacter pylori infection among adults.

Methods: A hospital based cross-sectional study was conducted from December 2012 to February 2013 among 349 adults. All stool specimens were screened for fecal Helicobacter pylori antigen. Besides, all study units were interviewed using a structured questionnaire.

Results: A total of 150 (43%) males and 199 (57%) females were involved in the study. The age of participants were ranged between 20-89 years with a mean age of 36.7 ± 14.7 and median 32 years. The overall prevalence of Helicobacter pylori infection was 50.7% (177/349). Helicobacter pylori infection was positively associated with those whose occupation were agrarians (OR=1.85 (95% CI 1.02-3.39, p=0.045)); being male (OR=1.98 (95% CI 1.42-3.29, p=0.011)), more than 5 persons living in the same house, (OR=2.36 (95% CI 1.00-5.47, p=0.048)), those practiced open field defecation/no toilet use, (OR=2.25 (95% CI 2.11-21.61, p=0.001); those who never wash their hands after toilet,(OR=1.98 (95% CI 1.42-3.29, p=0.011)), more than 5 persons living in the same house, [(OR=1.53 (95% CI 1.00-2.34, p=0.048)]; those practiced open field defecation/no toilet use, (OR=6.75 (95% CI 2.11-21.61, p=0.001); those who never wash their hands after toilet,(OR=2.86 (95% CI 1.30-3.27, p=0.009). But a minimum alcohol consumption was negatively associated with Helicobacter pylori bacteria, (OR=0.39 (0.23-0.67, p=0.001).

Conclusion and recommendation: The overall prevalence of Helicobacter pylori infection in Debub Omo Zone was 50.7%. Poor hygienic practices and crowding were positively associated with Helicobacter pylori infection. On the other hand, consumption of little alcohol might protect infected against Helicobacter pylori bacteria. Increasing the awareness of the communities toward good hygienic practices might reduce the transmission of Helicobacter pylori infection.

Keywords: Helicobacter pylori; Alcohol; Infection; Transmission

Introduction

Nearly 50% of the world’s population is estimated to be infected with H. pylori, but the prevalence varies greatly among countries and among population groups within the same country. H. pylori is one of the most common infections in humans affecting 30-40% of persons living in the developed, and 80-90% of persons living in the developing world [1,2].

The prevalence among middle-aged adults is over 80 percent in many developing countries, as compared with 20 to 50 percent in industrialized countries. Therefore, overall prevalence is high in developing countries and lower in developed countries and within areas of different countries. There may be similarly wide variations in the prevalence between more affluent urban populations and rural populations. The principal reasons for these variations involve socioeconomic differences between populations [1,2].

H. pylori, the principal species of the genus Helicobacter, was discovered by Warren and Marshall in 1983. This is a small, curved, highly motile, gram-negative bacillus recognized as a chronic colonizer of the human stomach; and known to be one of the most genetically diverse of bacterial species. Biochemically it is urease, catalase and oxidase positive [2-4].

Globally, different strains of H. pylori appear to be associated with differences in virulence, and the resulting interplay with host factors and environmental factors leads to subsequent differences in the expression of disease. Age, ethnicity, gender, geography and socioeconomic status are all factors that influence the incidence and prevalence of H. pylori infection [4].

A lack of proper sanitation, of safe drinking water, and of basic hygiene, as well as poor diets and overcrowding, all play a role in determining the overall prevalence of infection. In general, H. pylori sero-positivity rates increase progressively with age, reflecting a cohort phenomenon. In developing countries, H. pylori infection is markedly more prevalent at younger ages than in developed countries [3,5].

Despite many attempts at discovery, the exact source of infection has yet to be determined. Contaminated food or water sources have been cited as important risks for becoming infected with H. pylori. Laboratory experiments have found that H. pylori may survive up to a week in water [6].

Even though H. pylori infection in humans has been convincingly linked to the development of gastrointestinal (GI) diseases, only a small percentage of colonized individuals will express clinical manifestations. The virulence of the infecting strain is likely to be a major determinant for developing the diseases, although the process is a complex interaction between host and bacteria. A proposed determinant for the outcome of colonization is the ability of the bacterium to attach to the gastric
epithelium. In vitro studies have indicated that *H. pylori* strains express a variety of adhesins that recognize a number of epithelial receptors [7].

One of these receptors is the antigen of the Lewis blood group system that is not only synthesized by erythrocytes and blood vessel endothelium but by secretory cells of the stomach. Demonstration showed that the blood group antigen Lewis b on the gastric epithelial cells acted as an *H. pylori* receptor in vitro, and it has further been shown that the Lewis b receptor recognizes the product of the *H. pylori babA* gene [8].

The principal reservoir of *H. pylori* is man, but there have been descriptions of infection spread by means of water or uncooked vegetables contaminated with sewage and a host of other factors [2]. The role of domestic animals in the spread of infection still remains unclear. The putative routes of transmission of the organism have been reported to be fecal-oral, oral-oral, and gastric-oral [9].

Once a person is infected, it can persist in the stomach for decades despite a systemic immune response. The reasons for the failure of the immune system to control infection may be attributed to the fact that *H. pylori* produces chemical components in their cell walls that are very much similar molecules made by the stomach cells of the host. This creates a problem for the immune system, because it is designed to ignore molecules made by the host (self) and to recognize molecules produced by infectious agents (non-self) [10,11].

There are various techniques of detecting *H. pylori* from specimens. These tests may be invasive or non-invasive. Endoscopy and gastric mucosal biopsy, microscopic examination of histological sections and rapid urease test are forms of invasive test that could be used. Non-invasive tests such as Urea Breath Test (UBT), Enzyme Linked Immuno Sorbent Assay (ELISA), *H. pylori* stool antigen test (HpSTAR and HpSA), and latex agglutination tests are important tests. Detection of the antigen however gives a more precise result considering the waning nature of antibodies especially after an infection [10,12].

No single agent has been shown to be effective for curing infection in the majority of patients. Because of the increasing problem of antimicrobial resistance, extended (10-14 day) proton pump inhibitor–based regimens with at least 2 drugs (preferably 3 or 4) should be used for treatment [13,14].

**Methods**

**Study area**

The study was conducted at Jinka Zonal Hospital, Debub Omo Zone, Southern Nations, Nationalities and Peoples Region (SNNPR), Jinka Zonal Hospital is the only Zonal Hospital found within the South Omo zone. Patients were come to this Hospital from different health facilities and wored as of the zone.

**Study design and period**

Hospital based cross-sectional study was conducted from December 2012 to February 2013.

**Source population**

All adults with Upper Gastro-Intestinal (UGI) symptoms who visited the hospital.

**Study population**

All adults with Upper Gastro-Intestinal (UGI) symptoms who visited the Hospital during the study period.

**Stool *H. pylori* antigen**

Stool specimen was collected in clean, wide mouth and screw caped containers. Stool antigen test, (Croma test, linear chemicals S.L.), is a qualitative immune-chromatography assay for the determination of *Helicobacter pylori* antigen in fecal samples. The membrane is pre coated with monoclonal antibodies, on the test band region, against *H. Pylori* antigens.

**Blood collection**

The blood specimen was collected by using capillary tube from figure prick to determine ABO blood group using slide method. ABO blood grouping was determined by testing unknown red cells against known anti A, and anti B antibodies (Croma test, linear chemicals S.L.).

**Statistical method**

Statistical analyses were done using chi-square to evaluate any association between *H. pylori* infections with different risk factors. Observed differences in data were considered significant and noted in the text if p<0.005 was obtained.

**Results**

A total of 349 individuals who had upper gastrointestinal symptom were enrolled in this study. The age of participants were ranged between 20 and 89 years with a mean age of 36.7 ± 14.7 and median of 32 years. Of the total study participants, majority, 199(57%) and 216(61.9%) were female and married respectively. Farming 156(44.7%) was the means of livelihood for most study participants. Among the total study participant, 188(53.9%) were residing from rural, 161(46.1%) were protestant and 144(40.4%) were illiterate.

Among 349 study participants, fecal *H. pylori* antigen was detected in 177(50.7%). The prevalence of *H. pylori* infection among age group less than 30 years (48.1%) was almost similar to age group 30–49 years old (47.9%). While there was an increase prevalence of *H. pylori* infection was recorded among participants aged ≥ 50 years (61.8%). High prevalence of *H. pylori* infection were noted among pastoralists, 25/37(67.6%) and Merchants, 30/50(60%) (Table 1).

The prevalence of *H. pylori* was assessed for any association with the socio-demographic data, health character, living style and hygienic practices of the respondents. Of the total males participants, 91/149 (61%) were positive for *H. pylori* stool antigen compared with females 86/200 (43%). The overall OR of *H. pylori* infection for males compared with females was OR=1.98 (95%CI 1.42-3.29, p=0.011). Hence, males are more likely to be infected with *H. pylori* bacteria than females. Statistical significant association was noted between *H. pylori* infection and occupation (p<0.05) of the study participants. Even though the prevalence of *H. pylori* infection were high among pastoralists, 25/37(67.6%) and Merchants, 30/50(60%), there was no statistical significance association were observed. Clearing the possible confounding factors, a multiple logistic regression model showed that statistical significant difference was recorded between agrarian and fecal *H. pylori* Antigen positive. i.e. OR=1.85(95%CI 1.02-3.39, p=0.045). Therefore, the odds of having *H. pylori* infection among agrarians were high (Table 2).

From the total study participants, 20 out of 31 (64.5%) AB blood group, 43 out of 85 (50.6%) A blood group, 52 out of 104 (50%) B blood groups were positive for *H. pylori* stool antigen respectively (Table 3). However, no statistical significant associations were observed between fecal *H. pylori* infection and blood group (p>0.05).

Statistical significant association was detected between *H. pylori* infection and alcohol consumption (p<0.05). In addition, a multiple logistic regression clearly noted that alcohol consumption less than once a week can reduce *H. pylori* infection by 61% as compared to those who never drank alcohol [OR=0.39(95% CI 0.23-0.67, p=0.001)]. But no association was distinguished between alcohol consumption more than
once a week and *H. pylori* infection. In conclusion, alcohol consumption is an independent predictor for *H. pylori* infection.

The prevalence of *H. pylori* infection was 56.1% and 43.9% among the number of persons living in the same house containing < 5 persons and ≥ 5 persons respectively. Statistical significant association was detected with *H. pylori* infection (p<0.05). A multiple logistic regression showed that association was detected between *H. pylori* infection and number of persons living in the same house containing ≥ 5 persons [OR = 1.53(95%CI 1.10-2.34, p = 0.048)]. Hence, crowded families are more likely to be infected with *H. pylori* bacteria than families contain less than 5 persons in the house. Therefore, crowding is an independent predictor of *H. pylori* infection.

Of the total study participants, 315 used either private or public latrine. But the rest practiced open field defecation/no toilet. Out of 24 individuals who used public latrine, seven (29.8%) were positive for *H. pylori* fecal antigen. While 145 (49.8%) individuals who used private latrine were also infected. In addition, among the participants who practiced open field defecation/no toilet, 25% (73.5%) were positive for *H. pylori* stool antigen tests. Statistically significant association was detected between latrine usage and *H. pylori* infection (p<0.05) (Table 4).

Generally, multiple logistic regression model noted that, the odds of *H. pylori* infection among individuals who practiced open field defecation/no toilet/ and used public latrine were 6.8 and 2.8 times higher than those used private latrine, [OR = 6.75(95% CI 2.11-21.6, p = 0.001) and 2.80(95% CI 1.26-6.20, p = 0.011), respectively. Therefore, toilet use is another independent predictor of *H. pylori* infection.

Among participants who had never washed their hands after toilet, 32 (72.7%) were positive for *H. pylori* infection and it has statistically significant association with fecal *H. pylori* antigen positivity (p<0.05). Multiple logistic regression model showed, [OR=2.86(95%CI 1.30-3.27, p=0.009)]. Hence, the odds of being infected by *H. pylori* bacteria among individuals who never wash their hands after toilet is 2.86 times higher than those wash their hands always after toilet use. Therefore, this hygienic practice is an independent predictor of *H. pylori* infection.

Among the different variables, no statistical significant difference were observed in education level, monthly income, religion, smoking habit, residence, previous history of dyspepsia, number of sibings, number of beds, domestic animals, toilet type, water source, hand wash before meal, habit of raw vegetable, fruit and raw milk consumption with *H. pylori* infection.

A total of 150(43%) males and 199(57%) females were involved in the study. The age of participants were ranged between 20-89 years with a mean age of 36.7 ± 14.7 and median 32 years. Among 349 study participants, 177(50.7%) were positive for fecal *H. pylori* antigen. *H. pylori* infection were positively associated with males (AOR=1.98(95% CI 1.42-3.29, p=0.011), whose occupation were agrarians (AOR=1.85(95% CI 1.02-3.39, p=0.045); number of persons living in the same house (≥ 5 persons) (AOR=1.53(95% CI 1.10-2.34, p=0.048)); those practiced open field defecation/no toilet use (AOR=6.75(95% CI 2.11-21.61, p=0.001); those who never wash their hands after toilet use(AOR=2.86(95% CI 1.30-3.27, p<0.009). But negatively associated with individuals who drank alcohol less than once a week (AOR=0.39(0.23-0.67, p=0.001) (Table 5).

**Discussion**

Infection with *H. pylori* occurs worldwide, but the prevalence varies greatly among countries and among population groups within the same country. The mode of *H. pylori* transmission however remains controversial [15].

### Table 2: Distribution of Helicobacter pylori infection with socio-demographic characters among participants at Jinka Zonal Hospital, Debub Omo Zone, SNNPR, 2013 (n=349)

| Variable       | Positive (%) | Negative (%) |
|----------------|--------------|--------------|
| Age group      |              |              |
| <30 years      | 78 (48.1)    | 84 (51.9)    |
| 30-49 years    | 57 (47.9)    | 62 (52.1)    |
| >50 years      | 42 (61.8)    | 26 (38.2)    |
| Sex            |              |              |
| Male           | 91 (61)      | 58 (39)      |
| Female         | 86 (43)      | 114 (57)     |
| Marital status |              |              |
| Single         | 77 (22.1)    |              |
| Married        | 216 (61.9)   |              |
| Divorced       | 31 (8.9)     |              |
| Widowed        | 25 (7.2)     |              |
| Education      |              |              |
| Illiterate     | 141 (40.4)   |              |
| Read and write | 19 (5.4)     |              |
| Grade 1-8      | 91 (26.1)    |              |
| Grade 9-12     | 52 (15.2)    |              |
| Certificate and above | 45 (12.9) |              |
| Occupation     |              |              |
| Agrarian       | 145 (41.5)   |              |
| Merchant       | 50 (14.3)    |              |
| Government employee | 62 (17.8) |              |
| House wife     | 44 (12.6)    |              |
| Pastoralist    | 37 (10.6)    |              |
| Others         | 11 (3.2)     |              |

Table 1: Frequency of socio-demographic characteristics of participants, Jinka Zonal Hospital, Debub Omo Zone, SNNPR, 2013 (n=349)
The prevalence of *Helicobacter pylori* infection was high in those who used private latrine and the largest on Gondar (85.6%), Arbaminch (73%), and Hawassa (62.3%). The possible explanation is that the prevalence of *H. pylori* infection varies among countries and among population groups within the same country. This is may be due to the above studies was done in different age groups and used different study design and sample size [12,15-17].

In this study the overall prevalence of *H. pylori* infection was 50.7% (177 of 349), which was less than studies done in Addis Ababa (89%), Gondor (85.6%), Arbaminch (73%), and Hawassa (62.3%). The possible explanation is that the prevalence of *H. pylori* infection varies among countries and among population groups within the same country. This is may be due to the above studies was done in different age groups and used different study design and sample size [12,15-17].

Another explanation may be the different sensitivity of the method of laboratory diagnosis. Serological testing was used in the above studies whereas *H. pylori* stool antigen was used in this study. This test detects active infection, while serology does not differentiate between current and past infection. Therefore, the use of serology may lead to an overestimation of prevalence by including subjects who had been infected but were cured prior to testing [15].

This study showed that statistical significant difference was obtained between prevalence of *H. pylori* infection and gender. i.e. *H. pylori* colonization was higher in males OR=1.98(95%CI 1.42-3.29, p=0.011) than in females. This finding is in accordance with many reports from the literature where males were found to have significantly higher infection rates than females [5,18,19].

Several studies illustrate that immunological differences exist between the sexes that may underlie increased infection in males. Females typically have higher immune responses than males.

It was not found statistically significant association with age group, ethnicity, and marital status, place of residence, monthly income, and education (p>0.05). However, many studies found a strong association between these factors and *H. pylori* infection, there are also some that did not associate. Increased age was associated with *H. pylori* infection in Addis Ababa, Gondor, Hawassa, Tanzania and other developing countries. Rural residence was related in Taiwan and Kazakhstan. Studies did not found a significant association between *H. pylori* infection with ethnicity, low educational level and monthly income in Hawassa, Turkey, Mexico and Mato Grosso. All these reports are consistent with the concept that the most important factors influencing the transmission of an infection may differ with geographical location and study population. Therefore, the absence of statistically significant association with these demographic factors in this study (p>0.05) might be due to similar grounds with the above concept including difference in sample size [12,20-26].

In our study, we found a higher prevalence of *H. pylori* infection in those having small number rooms (53.3%) and an increase of people sharing the same bed (51.1%). But no significant association was noted with the infection. This difference may be due to the small sample size used in our study.

In this study, the prevalence of *H. pylori* infection was high in those who practiced open field defecation/no toilet i.e. 73% and public latrine users 29.2% respectively. Statistical significance associations were obtained between *H. pylori* infection and latrine usage. Therefore, individuals who use private latrine was less likely infected with *H. pylori* than the others. No identical data were, however, available on that aspect for comparison.

| Variables       | Positive (%) | Negative (%) | COR(95% CI) | p value | AOR(95% CI) | p value |
|-----------------|--------------|--------------|-------------|---------|-------------|---------|
| Age group       |              |              |             |         |             |         |
| <30 years       | 78 (48.1)    | 84 (51.9)    | 1 (Reference) |         |             |         |
| 30-49 years     | 57 (47.9)    | 62 (52.1)    | 0.99(0.62-1.59) | 0.967   |             |         |
| >50 years       | 42 (61.8)    | 26 (38.2)    | 1.74(0.98-3.10) | 0.06    |             |         |
| Sex             |              |              |             |         |             |         |
| Male            | 91(61)       | 58(39)       | 2.08(1.35-3.20) | 0.001*  | 1.98(1.42-3.29) | 0.011*  |
| Female          | 86(43)       | 114(57)      | 1 (Reference) |         |             |         |
| Education       |              |              |             |         |             |         |
| Illiterate      | 71 (50.4)    | 70 (49.6)    | 1.47(0.33-6.58) | 0.612   |             |         |
| Read and write  | 10(52.6)     | 9(47.4)      | 1.95(0.34-11.06) | 0.451   |             |         |
| Grade 1-8       | 42(46.2)     | 49(53.8)     | 1.01(0.25-4.07) | 0.993   |             |         |
| Grade 9-12      | 27(50.9)     | 26(49.1)     | 0.85(0.22-9.25) | 0.797   |             |         |
| Certificate and above | 27(60)    | 18(40)       | 1 (Reference) |         |             |         |
| Occupation      |              |              |             |         |             |         |
| Agrarians       | 62(42.8)     | 83(57.2)     | 0.54(0.30-0.99) | 0.045*  | 1.85(1.02-3.39) | 0.044*  |
| Merchants       | 30(60)       | 20(40)       | 1.08(0.51-2.31) | 0.836   | 0.92(0.43-1.97) | 0.836   |
| Others          | 5(45.5)      | 6(54.5)      | 0.60(0.17-2.19) | 0.44    | 1.66(0.46-6.03) | 0.44    |
| House wife      | 19(43.2)     | 25(56.8)     | 0.55(0.25-1.200) | 0.132   | 1.82(0.83-3.98) | 0.132   |
| Pastoralists    | 25(67.6)     | 12(32.4)     | 1.50(0.64-3.53) | 0.348   | 0.66(0.28-1.56) | 0.348   |
| Gov. Employee   | 36(58.1)     | 26(41.9)     | 1 (Reference) |         |             |         |

Table 3: The prevalence of *H. pylori* was assessed for any association with the socio-demographic data, health character, living style and hygienic practices of the respondents

COR: Crude Odds Ratio; AOR: Adjusted odds ratio; 95% CI: 95% confidence interval; OFD: Open Field Defecation; VIP: Ventilated Improve Pit latrine; * significance difference
The assumption is that, poor personal and environmental hygiene may play a great roll in the transmission of *H. pylori* bacteria. These findings supports the notion of oral-oral or fecal oral route with or without intermediate vectors of transmission which is thought to be the primary route of transmission [27].

These findings are in accordance with several reports in the literature that assessed the relationship between alcohol consumption and *H. pylori* infection. A pooled analysis of three studies from Southern Germany, comprising 1410 adults aged 15 to 69, showed that prevalence of current *H. pylori* infection was lower among subjects who consumed alcohol (34.9%) than among non-drinkers (38.0%), regardless of the type of alcoholic beverages consumed. In 2002, the report of the Bristol Helicobacter Project found a negative association between consumption of wine and beer and *H. pylori* infection prevalence in 10,537 participants [28,29]. Given the fact that acquisition of *H. pylori* infection occurs in childhood, the inverse association between alcohol consumption and *H. pylori* infection would more likely reflect suppression or elimination of the infection by alcohol consumption rather than reduced rates of acquisition of the infection. [28,29].

In this study, high prevalence of *H. pylori* infection was detected in those who never washed their hands after toilet use (72.7%), this poor hygienic practice increase the odds of infection with *H. pylori* bacteria by 2.86 times.

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### Table 4: Distribution of *H. pylori* infection and association with different medical character and life style of the respondents at Jinka Zonal Hospital, Debub Omo Zone, SNNPR, 2013 n=349

| Variables                              | Positive (%) | Negative (%) | COR(CI)       | p value | AOR(CI)       | p value |
|----------------------------------------|--------------|--------------|---------------|---------|---------------|---------|
| **Blood groups**                       |              |              |               |         |               |         |
| A                                      | 43 (50.6)    | 42 (49.4)    | 0.56(0.24-1.32) | 0.185   |               |         |
| B                                      | 52 (50)      | 52 (50)      | 0.55(0.24-1.26) | 0.158   |               |         |
| O                                      | 62 (48.1)    | 67 (51.9)    | 0.51(0.23-1.15) | 0.103   |               |         |
| AB                                     | 20 (64.5)    | 11 (35.5)    | 1 (Reference)  |         |               |         |
| **Alcohol consumption**                |              |              |               |         |               |         |
| No use                                 | 81(43.5)     | 105 (56.5)   | 1(Reference)  |         |               |         |
| <Once a week                           | 55 (66.3)    | 28 (33.7)    | 2.55(1.49-4.37) | 0.001*  | 0.39(0.23-0.67) | 0.001*  |
| >Once a week                           | 41 (51.3)    | 39 (48.7)    | 1.36(0.81-2.31) | 0.248   | 0.73(0.43-1.24) | 0.25    |
| **Smoking habit**                      |              |              |               |         |               |         |
| Current smoking                        | 5 (45.5)     | 6 (54.5)     | 1.55(0.70-3.41) | 0.28    |               |         |
| Ex-smoked                              | 17 (60.7)    | 11 (39.3)    | 0.83(0.25-2.79) | 0.767   |               |         |
| Never smoked                           | 155 (50)     | 155 (50)     | 1(Reference)  |         |               |         |
| **Previous history of dyspepsia**      |              |              |               |         |               |         |
| Yes                                    | 96 (48.5)    | 102 (51.5)   | 1.23(0.80-1.88) | 0.34    |               |         |
| No                                     | 81 (53.6)    | 70 (46.4)    | 1(Reference)  |         |               |         |
| **No of person living in the same house** |            |              |               |         |               |         |
| <5                                     | 97 (56.1)    | 76 (43.9)    | 1(Reference)  |         |               |         |
| >5                                     | 80(45.5)     | 96(54.5)     | 0.65(0.43-0.99) | 0.048*  | 1.53(1.10-2.34) | 0.048*  |
| **No of siblings**                     |              |              |               |         |               |         |
| <2                                     | 71 (54.2)    | 60 (45.8)    | 1(Reference)  |         |               |         |
| 5-Mar                                  | 73 (52.9)    | 65 (47.1)    | 1.69(0.96-2.96) | 0.069   |               |         |
| >6                                     | 33 (41.3)    | 47 (58.7)    | 1.6(0.92-2.79) | 0.098   |               |         |
| **No of rooms**                        |              |              |               |         |               |         |
| 1                                      | 114 (53.3)   | 100 (46.7)   | 1.22(0.56-2.66) | 0.614   |               |         |
| 4-Feb                                  | 49 (46.2)    | 57 (53.8)    | 0.92(0.40-2.10) | 0.845   |               |         |
| >4                                     | 14 (48.3)    | 15 (51.7)    | 1(Reference)  |         |               |         |
| **No of beds**                         |              |              |               |         |               |         |
| <2                                     | 163 (51.1)   | 156 (48.9)   | 0.33(0.21-3.01) | 0.853   |               |         |
| 3                                      | 14 (48.3)    | 15 (51.7)    | 1.11(0.52-2.38) | 0.784   |               |         |
| 4                                      | 0            | 1            | 1(Reference)  |         |               |         |
| **Domestic animal**                    |              |              |               |         |               |         |
| Yes                                    | 97 (52.7)    | 87 (47.3)    | 0.84(0.55-1.29) | 0.43    |               |         |
| No                                     | 80 (48.5)    | 85 (51.5)    | 1(Reference)  |         |               |         |

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than those who washed always their hand after toilet used. The possible explanation is that poor personal and environmental hygiene contribute to the transmission of the bacterium via feco-oral rout.

Individuals with blood group O were found to be more susceptible to peptic ulcer disease for decades without known cause until the relationship between Lewis antigens and the attachment of \textit{H. pylori} to gastric mucosa was observed. However, the correlation between \textit{H. pylori} infection and ABO blood types was not supported in some reports, Addis Ababa, Bahir Dar and Gondar. In this study, although the most prevalent blood group was blood type O (43%), subjects with blood group O didn't show an increased susceptibility to \textit{H. pylori} infection than those with other blood groups (p>0.05) [12,16,30-34].

**Conclusion**

Of the total study participants, 50.7% were positive for fecal \textit{Helicobacter pylori} antigen. High prevalence was noted among age group ≥ 50 year but no statistically significant association was detected (p>0.05). There was a considerable increase of \textit{H. pylori} prevalence in males than females and

| Variables                          | Positive (%) | Negative (%) | COR(CI)       | p value | AOR(CI)       | p value |
|------------------------------------|--------------|--------------|---------------|---------|---------------|---------|
| **Lavatory/Toilet used**           |              |              |               |         |               |         |
| Private                            | 145 (49.8)   | 146 (50.2)   | 1(Reference)  |         |               |         |
| Public                             | 7 (29.2)     | 17 (70.8)    | 0.42(0.17-1.03) | 0.058   | 2.80(1.26-6.20) | 0.011*  |
| OFD                                | 25 (73.5)    | 9 (26.5)     | 2.80(1.26-6.20) | 0.011*  | 6.75(2.11-21.61) | 0.001*  |
| **Toilet type**                    |              |              |               |         |               |         |
| Pit latrine                        | 148 (48.1)   | 160 (51.9)   | 2.08(0.39-11.18) | 0.392   |               |         |
| VIP                                | 4            | 3            | 1(Reference)  |         |               |         |
| **Water source**                   |              |              |               |         |               |         |
| Well water                         | 36(54.5)     | 30(45.5)     | 1.11(0.63-1.98) | 0.712   |               |         |
| Spring water                       | 24(49)       | 25(51)       | 0.89(0.47-1.69) | 0.725   |               |         |
| River water                        | 33(45.8)     | 39(54.2)     | 0.79(0.45-1.37) | 0.396   |               |         |
| Municipal water                    | 84(51.9)     | 78(48.1)     | 1(Reference)  |         |               |         |
| **Hand wash before meal**          |              |              |               |         |               |         |
| Never                              | 6            | 3            | 1.60(0.39-6.65) | 0.518   |               |         |
| Some times                         | 47(50)       | 47(50)       | 0.80(0.48-1.35) | 0.401   |               |         |
| Often                              | 44(43.1)     | 58(56.9)     | 0.61(0.36-1.01) | 0.056   |               |         |
| Always                             | 80(55.6)     | 64(44.4)     | 1(Reference)  |         |               |         |
| **Hand wash after toilet use**     |              |              |               |         |               |         |
| Never                              | 32(72.7)     | 12(27.3)     | 2.86(1.30-5.27) | 0.009*  | 2.86(1.30-3.27) | 0.009*  |
| Some times                         | 46(48.4)     | 49(51.6)     | 1.01(0.56-1.80) | 0.984   | 1.13(0.63-2.05) | 0.678   |
| Often                              | 57(46.3)     | 66(53.7)     | 0.93(0.53-1.60) | 0.782   | 1.35(0.77-2.35) | 0.296   |
| Always                             | 42(48.3)     | 45(51.7)     | 1(Reference)  |         |               |         |
| **Habit of raw vegetable and fruit consumption** | | | | | | |
| Rarely                             | 114(50.4)    | 112(49.6)    | 1(Reference)  |         |               |         |
| Daily                              | 10(50)       | 10(50)       | 0.98(0.39-2.45) | 0.97    |               |         |
| Weekly                             | 53(51.5)     | 50(49.5)     | 1.04(0.65-1.66) | 0.865   |               |         |
| **Wash before consumption of raw vegetables and fruits** | | | | | | |
| Never                              | 52(56.5)     | 40(43.5)     | 0.65(0.38-1.09) | 0.101   |               |         |
| Some times                         | 68(45.6)     | 81(54.4)     | 1.15(0.61-2.17) | 0.657   |               |         |
| Often                              | 42(60)       | 28(40)       | 0.50(0.23-1.08) | 0.079   |               |         |
| Always                             | 15(39.5)     | 23(60.5)     | 1(Reference)  |         |               |         |
| **Raw milk consumption**           |              |              |               |         |               |         |
| Yes                                | 85(46.2)     | 99(53.8)     | 0.68(0.447-1.039) | 0.075   |               |         |
| No                                 | 92(55.8)     | 73(44.2)     | 1(Reference)  |         |               |         |
| Residence                          |              |              |               |         |               |         |
| Urban                              | 81(50.3)     | 80(49.7)     | 1(Reference)  |         |               |         |
| Rural                              | 96(51.1)     | 92(48.9)     | 1.03(0.68-1.57) | 0.888   |               |         |

Table 5: Distribution of \textit{H. pylori} infection and association with different hygienic practices of the respondents at Jinka Zonal Hospital, Debub Omo Zone, SNNPR, 2013 n=349

COR: crude odds ratio; AOR: Adjusted odds ratio; 95% CI: 95% Confidence interval; OFD: Open Field Defecation; VIP: Ventilated Improve Pit latrine; * significance difference
being male had statistical significant association with *H. pylori* infection. Even though high prevalence were obtained among pastoralists (67.6%) and merchants (66%), statistical significant association were noted between agrarians and *H. pylori* bacteria [OR=1.85(95% CI 1.02-3.39), p=0.045].

Statistically significant positive associations were obtained between *H. pylori* infections and more than or equals to five persons living in the same house (crowding) and poor hygienic practices. But consumption of little alcohol might protect from being infected by *H. pylori* bacteria [OR=0.39(95% CI 0.23-0.67, p=0.001)].

No statistical significant difference were observed in education level, monthly income, religion, smoking habit, previous history of dyspepsia, number of siblings, number of beds, domestic animals, toilet type, water source, hand wash before meal, habit of raw vegetable and fruit consumption, wash before consumption of raw vegetable and fruits and raw milk consumption with *H. pylori* infection. 57.9 %(202) were positive for at least one of the different intestinal parasites. Therefore, good hygienic practices may reduce infection with *H. pylori* bacteria.

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