Frontiers in Environmental Microbiology
2022; 8(3): 46-54
http://www.sciencepublishinggroup.com/j/fem
doi: 10.11648/j.fem.20220803.11
ISSN: 2469-7869 (Print); ISSN: 2469-8067 (Online)

Feco-Prevalence and Associated Factors of *H. Pylori* Infection Among Adult Dyspeptic Patients Attending Public Health Centers at Adama Woreda, Oromia, Ethiopia

Legese Lemma Zeme[1], Yohannes Beneberu[2], Girma Mulisa[3]

[1]Department of Medical Laboratory, Adama Science and Technology University, Adama, Ethiopia

[2]Department of Medical Laboratory, Rift Valley Hospital, Adama, Ethiopia

[3]Department of Bio-medical Science, Adama Hospital Medical College, Adama, Ethiopia

Email address:

legeselemma99@gmail.com (L. L. Zeme), yohannesbeneberu@yahoo.com (Y. Beneberu), girmamulisa30@gmail.com (G. Mulisa)

To cite this article:

Legese Lemma Zeme, Yohannes Beneberu, Girma Mulisa. Feco-Prevalence and Associated Factors of *H. Pylori* Infection Among Adult Dyspeptic Patients Attending Public Health Centers at Adama Woreda, Oromia, Ethiopia. *Frontiers in Environmental Microbiology*. Vol. 8, No. 3, 2022, pp. 46-54. doi: 10.11648/j.fem.20220803.11

Received: July 21, 2022; **Accepted**: August 4, 2022; **Published**: August 10, 2022

Abstract: Approximately 4.4 billion people worldwide are estimated to be positive for *H. pylori*. In developing countries like Ethiopia supposed to be a high prevalence and exposure of *H. pylori* infection where bacterial transmission is facilitated by poor hygiene and sanitation conditions. In addition, many studies used serology rapid tests for the detection of *H. pylori* which have questionable performance in detecting acute infection. Thus this study aimed to determine Feco-prevalence and associated factors of *H. pylori* infection among adult dyspeptic patients attending public health centers at Adama Woreda, East Shoa zone, Oromia, Ethiopia from May to July 2021 by stool Antigen test. Methods: A cross-sectional study was conducted on 356 adult dyspeptic patients by using a systematic random sampling technique. Data on socio-demographic characteristics and potential associated factors of *H. pylori* infection were collected by a structured interviewer-administered questionnaire. *H. pylori* stool antigens were detected by Wondfo one-step *H. pylori* feces test kit according to the manufacturer`s instruction. Data entries were done by EPI info version 7 and analyzed using SPSS version 23.0. Binary and multiple logistic regressions were used to identify associated factors. Association between variables was considered statistically significant only if A two-sided P-value <0.05 at a 95% confidence level. Result: The overall Feco-Prevalence of *H. pylori* infection among dyspeptic patient accounts 23.0% (95% CI: 19.1, 27.5). Among many possible factors unable to read and write [AOR]: 6.4 (1.9, 21.3)] and elementary educational status [AOR]: 4.2 (1.3, 13.19)], being blood group O [AOR]: 33.4 (5.9, 189.8)], drinking alcohol [AOR]: 6.4 (1.1, 36.6)], eating raw vegetables and fruit [AOR]: 6.2 (2.4, 15.7)] and not hand washing habit before a meal [AOR]: 24.5 (7.4, 81.6)] were a strong predictor of *H. Pylori* infection. Conclusion and recommendation; this study indicated overall *H. pylori* Feco-prevalence was found to be 23%. Among several possible factors unable to read and write, being in blood group O, drinking alcohol, and not hand washing habit before the meal were significant determinants of *H. pylori*. Therefore; we recommend improving personal and environmental sanitation including water to reduce the burden of this bacterium.

Keywords: Feco-Prevalence, *H. Pylori*, Adama Woreda, Oromia, Ethiopia

1. Introduction

Helicobacter pylori are a spiral-shaped, Gram-negative, microaerophilic, and fastidious microorganism [1]. It was discovered by Marshall and Warren who cultured Campylobacter pyloridis, which was later reclassified as Helicobacter pylori in 1983 [2]. This bacterium exhibits two to six-helix flagella; that grant high motility and support for penetrating the human gastric mucosa [3]. Nearly 50% of the world's population is estimated to be infected with *H. pylori*, but the Feco-prevalence varies greatly among countries and 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 [4, 5]. Infection with *H. pylori* has a reported annual incidence of 0.3-0.7% in developed countries and 6-14% in developing countries [2].

H. pylori infection continues to be a major public health issue worldwide. Approximately 4.4 billion people worldwide are estimated to be positive for *H. pylori* [6]. The prevalence is highest in Africa 79.1%, latin America and Caribbean 63.4% and Asia 54.7%. In contrast, *H. pylori* prevalence is lowest in north America 37.1% and Oceania 24.4% [6, 7]. These differences in *H. pylori* prevalence likely reflect the level of urbanization, sanitation, access to clean water, and varied socioeconomic status [6, 8].

The prevalence of *H. pylori* in Ethiopia is in the range 7.7 to 91.0% [9]. It is a common reason to seek primary healthcare service and accounts for 10% of hospital admissions [10]. The prevalence of *H. pylori* vary from region to region in Ethiopia the highest prevalence was found in Somalia 71%, Oromia 39.9%, Other regional prevalence rates were 48.1% in Addis Ababa, 54.6% in Amhara, 48.7% in Benishangul Gumuz and 53.6% in SNNPR [9].

Among the world health organization (WHO) published a list of 16 antibiotic-resistant bacteria that pose the greatest threat to human health. They listed three priorities: critical, high, and medium. *H. pylori* was thus categorized as a high-priority pathogen for research and development of new and effective treatments [11]. In addition, recommendations are emerging to change approaches to the management of *H. pylori* due to increased drug resistance [9]. The success of these developments needs knowledge of the prevalence of *H. pylori*.

H. pylori infects 50% of the world's population and accounts for >95% of gastric cancers. Gastric cancer is the third most common cause of cancer death worldwide [11]. According to WHO nearly 550,000 new cases of stomach cancer, attributed to *H. pylori*, are recorded annually. This represents about 55% of all cases of this cancer globally [12]. Several authors have emphasized the role of factors such as age, socio-economic status, poor hygiene/deficient sanitation, density/ crowded living conditions, smoking, use of a non-steroidal anti-inflammatory drug (NSAID), blood group O, high body mass index, and family history of gastric disease in the acquisition and transmission of *H. pylori* [3, 13].

Diagnosis of *H. pylori* relies on invasive techniques (such as histology, culture, polymerase chain reaction, and rapid urease test) and non-invasive techniques (such as stool test and serology). But non-invasive techniques are preferable in epidemiological studies [7, 13]. Even though serology is the most commonly used test in most developing countries like Ethiopia; it is not appropriate for the diagnosis of active *H. pylori* infection. This is due to its low specificity (79-83%) and presence of high titer of IgG for years after eradication of infection. More the stool test demonstrates the presence of antigens while serology detects antibodies to *H. pylori*. Lastly serologic tests are limited by false positivity because of cross-reactions. Previous studies have confirmed the superiority of the stool antigen test over serology in terms of true outcomes and cost [7, 11, 13].

In developing countries like Ethiopia supposed to be a high prevalence and exposure of *H. pylori* infection where bacterial transmission is facilitated by poor hygiene and sanitation conditions [9, 14]. In addition, many studies used serology rapid tests for the detection of *H. pylori* but few data on stool antigen test indicates active infection and are more sensitive and specific as compared [13]. Generally, serology tests have questionable performance in detecting acute infection and distinguishing active infection from previous exposure. This puts a major limitation to know the actual incidence and real association of *H. pylori* infection with potential risk factors. Hence, by taking this into consideration the current study was conducted to determine the prevalence of *H. pylori* infection and potential risk factors among the dyspeptic patients attending public health facilities in Adama woreda, using the stool antigen technique.

2. Methods and Materials

2.1. Study Area / Setting

The study was conducted in Adama woreda, located in East Shoa administrative Zone. There are 10 public health centers in Adama woreda. Namely shewa Alem tena health center, Guraja health center, Awash melkasa health center, Wonji gefersa health center, Sirerobi health center, cheka dewaro health center, Wonjikuriftu health center, Gedemsa health center, Mukiye Haro health center and Geldeya health center. The data obtained from Adama Woreda health office shows a total of 9637 dyspeptic patients were examined within a month among those health centers.

2.2. Study Design and Period

A cross sectional study was conducted dyspeptic patients attending at public health centers at Adama Woreda, from May to July, 2021.

2.3. Population

2.3.1. Source Population

All dyspeptic patients who were clinically suspected for *H. pylori* infection and visited the outpatient department during the study period were included in the study.

2.3.2. Study Population

Those randomly selected dyspeptic patients who were clinically suspected for *H. pylori* infection.

2.3.3. Inclusion and Exclusion Criteria

Inclusion criteria

Adult dyspeptic patients who were clinically suspected for *H. pylori* infection.

Exclusion criteria

Patients who had been taking proton pump inhibitor or other antibiotics against *H. pylori* within the last 2 weeks before data collection period will be excluded from the study.

2.4. Sample Size Determination and Sampling Procedure

2.4.1. Sample Size Determination

Sample size were determined using single population proportion formula by taking Feco-prevalence of *H. pylori* infection among dyspeptic patients attending Dessie referral hospital 30.4% [13]. We follow basic assumption of sample size calculation in that by taking p=0.304 and Using the following assumptions where = (Absolute level of precision) or margin of error (d^2) of 5% at 95% confidence level. Adding 10% non-response rate; therefore a total of 356 dyspeptic patients will be included in the study.

$$n = \frac{(Z_{\alpha/2})^2 \, p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 0.304(1-0.304)}{(0.05)^2} = 324$$

By adding 10% non-response rate=324+32=356.

2.4.2. Sampling Procedure

A Systematic random sampling technique was used to select the study participants. From 10 public health centers in Adama Woreda four health centers are selected by simple random sampling techniques. First proportional allocation has been made according case load of dyspeptic patients to each health center. Totally there are 868 eligible dyspeptic patients visited outpatient of those selected health centers per month: therefore By dividing 868 eligible dyspeptic patients to our sample size 356 (868/356) we obtained sampling interval k of 2. From 1-2 patient, picking a patient on random for the initial start of patient, then dyspeptic patients were selected systematically by adding 2.

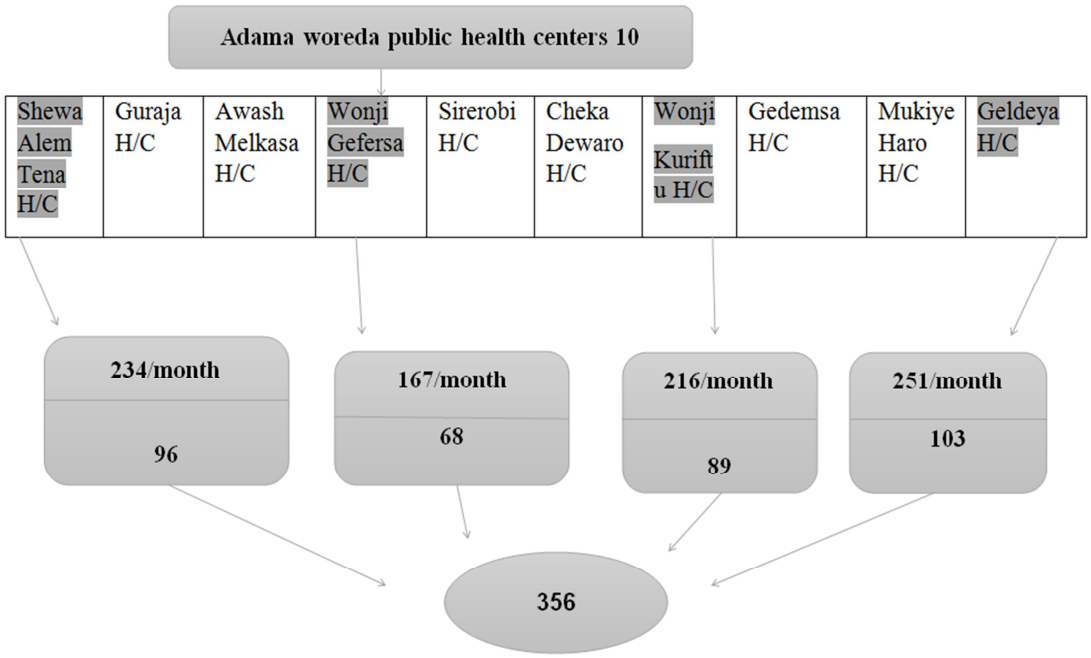

Figure 1. *Sampling procedure.*

2.5. Variables

2.5.1. Dependent Variables

Feco-prevalence of *H. pylori.*

2.5.2. Independent Variables

Socio-demographic

1) Age;
2) Sex;
3) Residency;
4) Level of education;
5) Occupation;
6) Marital status;
7) Family size;
8) ABO Blood group.

Environmental factors

1) Sources of drinking water;
2) hand washing before meal;
3) hand washing after toilet;
4) Washing hands with soap.

Behavioral factors

1) Chat chewing;
2) Cigarette smoking;
3) Drinking alcohol;
4) Tea consumption;
5) Coffee consumption;
6) Eating raw fruit and vegetable.

2.6. Operational Definitions

H. pylori positive: refers the h-pylori detected by stool antigen not by serum or other diagnosis methods.

2.7. Data Collection Procedures and Data Quality Assurance

Data on socio-demographic, environmental factors and behavioral characteristics of the study participants were collected using a structured pre-tested questionnaire via face-to-face interview. The Questionnaire was adopted after reviewing different literature of similar studies [10, 13, 16]. It was prepared in English, translated into the Afan Oromo language by native speakers and experts of the languages, and re-translated back to English and Afan Oromo language to check for any inconsistencies in the meaning of words and concepts. Four data collectors have recruited three laboratory technicians and one laboratory technologist as supervisor. Data collectors were trained for two days on a method of data collection by the principal investigator and they were informed about how to approach the respondents, how to apply the designed data collection method, general information on *H. pylori* infection, and the objective of the study. Data were collected after obtaining informed consent from the study participants.

Approximately 2 grams of a stool sample will be collected from each participant in a clean container. H. pylori stool antigen will detect by Wondfo one step *H. pylori* feces test kit (Guangzhou Wondfo Biotech, China) according to the manufacturer`s instructions. Capillary blood will be used to determine blood group ABO and RH by slide agglutination using monoclonal Anti A, Anti-B, and Anti-D antibodies according to manufacturer instructions.

To assure data quality, high emphasis was given to minimizing errors using the following strategies. The English version questionnaire will be translated into the Afan Oromo version and again back to English with the expertise of the language to avoid inconsistencies. The training was given to the data collectors and supervisors for two days on basic skills, ways of obtaining consent, and the objectives of the study by the principal investigator. The pretest was done on 5% of the sample size in unselected health centers that had similar settings to the current study settings. The principal investigator was undergone on-site supervision during the data collection period and reviewed all filled questionnaires the next morning of each data collection to identify incomplete and incoherent responses. The supervisor and principal investigator closely supervised the performance of the data collectors daily and the collected record sheets were thoroughly scrutinized every day at the end of the data collection session and any inconsistencies were amended on time.

2.8. Data Processing and Analysis

Before data entry, questionnaires were checked for errors, cleaned, coded, and entered into epi-info version 7 then exported to SPSS version 20 software package for analysis. Descriptive statistics were used for measures of frequency, central tendency, and dispersion of participants' characteristics computed as appropriate. Pearson Chi-square was done to determine the relationship between the independent and dependent variables. For variables with $p \leq 0.25$ in the bivariate Analysis, multivariable logistic regression models were subsequently employed to adjust for confounders (adjusted ORs with 95% CIs) of those risk factors that were found to be statistically significant by the bivariate analysis. Association between variables would be considered statistically significant only if A two-sided P-value <0.05 at a 95% confidence level.

2.9. Ethical Consideration

The study was ethically approved by Institutional Review Board (IRB) of Rift Valley University College. Before commencing data collection legal permission with letter of support were obtained from Adama woreda health office. All the study participants were informed about the purpose of the study and their right to refuse. Verbal informed consent was obtained from every respondent. Strict confidentiality was also maintained through coding of questionnaire anonymously.

2.10. Dissemination of Result

The results of this study will be presented to Rift Valley University College. The manuscript will be sent to local journals and international journals for publication. Hard copy provision to stake holders and Presentation on scientific meeting will be other option of dissemination.

3. Result

3.1. Socio-Demographic Characteristics of Study Participants

A total of 356 Adult dyspeptic patients who were clinically suspected for *H. pylori* infection were included in this study with response rate 100%. The mean age of study participants were 39 years with standard deviation 15. Concerning the sex and residence of participants, the majority 231 (63.1%) of them were female whereas about 346 (94.5%) of them were urban dwellers. When we look at participants` educational status, about 185 (52%) had attended secondary and above in their education. Out of the total participants 187 (52.5%) of participants were housewives at the time of study. Regarding participant's monthly income, about 187 (52.5%) earns less than 2000 Eth. Birr (Table 1).

Table 1. *Socio-demographic characteristics of Adult dyspeptic patients attending at public health centers at Adama woreda, 2021 (n=356).*

Variables		Frequency	
		NO	%
Age Category	< 30 Years	124	34.8
	31-50 Years	143	40.2
	Above 50 Years	89	25.0

Variables		Frequency	
		NO	%
Sex	Female	170	47.8
	Male	186	52.2
Residence	Rural	125	35.1
	Urban	231	64.9
Educational Status	Elementary	89	25.0
	Secondary School and Above	185	52.0
	Unable to read and write	82	23.0
	College and above	54	14.8
Average Monthly income	< 2000 Eth. Birr	187	52.5
	2000-5000 Eth. Birr	92	25.8
	Above 5000 Eth. Birr	77	21.6
Marital status	Married	271	76.1
	Not Married (Single, Divorced, Widowed)	85	23.9
Family size	< 3	11	3.1
	3 and Above	345	96.9
Person sharing the same bed room in the household	1	4	1.1
	2-3	194	54.5
	Above 3	158	44.4

3.2. Behavioral and Environmental Related Characteristics of Study Participants

From the finding it was observed that nearly half (51.1%) of study participants wash their hand with soup. About 202 (56.7%) and 2017 (61%) of study participants wash their hand after toilet and before meal respectively: regarding chat chewing 297 (83.4%) of them did not chew chat before. More over the finding also shows 307 (86.5%) participants had no drunken alcohol in their life. About 170 (47.8) of study participants were eat raw vegetables and fruit. Concerning Drinking water about 191 (53.7%) study participants used non-tap water for their daily consumption. Regarding blood group of study participants, majority of them were blood group O; 170 (47.8%); the remaining accounted by A; 100 (28.1%), B; 56 (15.7%) and AB; 30 (8.4%) respectively (Table 2).

Table 2. *Behavioral and environmental related characteristics Adult dyspeptic patients attending at public health centers at Adama woreda, 2021 (n=356).*

Variables		Frequency	
		NO	%
washing hand with soup	No	174	48.9
	Yes	182	51.1
Washing hand after toilet	No	154	43.3
	Yes	202	56.7
Hand washing habit before meal	No	139	39.0
	Yes	217	61.0
Eating raw vegetables and fruit	Yes	170	47.8
	No	186	52.2
Coffee consumption	Yes	155	43.5
	No	201	56.5
Tea consumptions	Yes	112	31.5
	No	244	68.5
Smoking cigarette	Yes	73	20.5
	No	283	79.5
chewing chat	Yes	59	16.6
	No	297	83.4
Drinking alcohol	Yes	48	13.5
	No	308	86.5
ABO Blood group	A	100	28.1
	AB	30	8.4
	B	56	15.7
	O	170	47.8
Drinking water source	Non-tap water	191	53.7
	Tap water	165	46.3

3.3. Feco-Prevalence of Helicobacter Pylori Infection

In this study the overall Prevalence of *Helicobacter pylori* infection among dyspeptic patient accounts 82 (23.0%) (95% CI: 19.1, 27.5) (Figure 2).

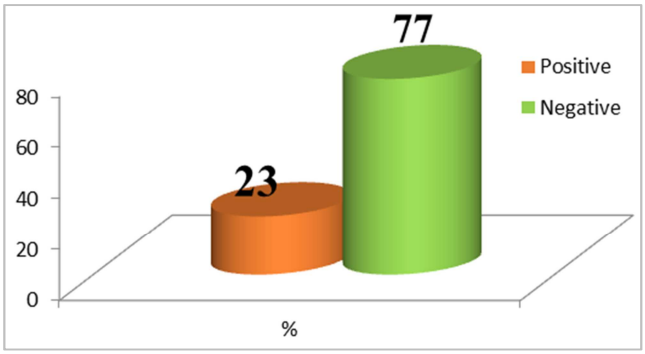

Figure 2. *Feco-prevalence of Helicobacter pylori infection attending at public health centers at Adama woreda, 2021 (n=356).*

3.4. Associated Factors for Helicobacter Pylori Infection

From the finding of Binary logistic regression it was observed that unable to read and write and elementary educational status, blood group O and A, drinking alcohol, chat chewing, Eating Raw Vegetables and Fruit, failure of Hand Washing Habit Before Meal and after toilet, drinking non tap water were strong predictor of *H. Pylori* infection (p. value < 0.05) whereas sex of study participants, marital status, place of residence, family size and coffee consumption had not shown significant association with *H. pylori* infection (p. value > 0.05) (Table 3).

However after fitting those variables into multiple logistic regressions model: only six variables unable to read and write [AOR]: 6.4 (1.9, 21.3)] and elementary educational status [AOR]: 4.2 (1.3, 13.19)], being blood group O [AOR]: 33.4 (5.9, 189.8)] and drinking alcohol [AOR]: 6.4 (1.1, 36.6)], eating raw vegetables and fruit [AOR]: 6.2 (2.4, 15.7)], not hand washing habit before meal [AOR]: 24.5 (7.4, 81.6)] and not hand washing habit after toilet [AOR]: 4.2 (1.3, 13.24)].

Table 3. *Associated factors of H. Pylori infection among adult dyspeptic patients attending Adama woreda public health centers, 2021 (n=356).*

Variables		*H. Pylori*		Crude OR (95% CI)	AOR (95% CI)
		Positive	Negative		
Sex	Female	45	125	1.00	
	Male	37	149	1.45 (0.9, 2.38)	
Marital Status	Married	64	207	1.00	
	Not Married	18	67	1.2 (0.6, 2.078)	
Educational Status	Unable to read and write	26	56	2.4 (1.3, 4.456)*	6.4 (1.9, 21.3)**
	Elementary	29	60	1.1 (0.5, 2.09)*	4.2 (1.3, 13.19)*
	2ndary School and Above	27	158	1.00	1.00
Place Of Residents	Rural	25	100	0.8 (0.5, 1.297)	
	Urban	57	174	1.00	
Blood Group	O	62	108	4.1 (1.14, 15.0)*	33.4 (5.9, 189.8)*
	A	17	83	0.4 (0.2, 0.80)*	1.1 (0.4, 2.6)
	B	3	53	1.1 (0.5, 2.09)	1.1 (0.5, 2.09)
	AB	0	30	1.00	1.00
Drinking alcohol	Yes	26	22	5.3 (2.8, 10.1)*	6.4 (1.1, 36.6)*
	No	56	252	1.00	1.00
Chewing chat	Yes	26	33	3.4 (1.9, 6.12)*	0.8 (0.16, 4.1)
	No	56	241	1.00	1.00
Coffee consumption	Yes	39	116	1.2 (0.75, 2.03)	
	No	43	158	1.00	
Eating raw vegetables and fruit	Yes	67	103	7.4 (4.1, 13.7)*	6.2 (2.4, 15.7)**
	No	15	171	1.00	1.00
Hand washing habit before meal	No	68	71	13.9 (7.3, 26.2)*	24.5 (7.4, 81.6)**
	Yes	14	203	1.00	1.00
Washing after toilet	No	73	81	19.3 (9.2, 40.5)*	4.2 (1.3, 13.24)*
	Yes	9	193	1.00	1.00
Drinking water	Non-Tap Water	70	121	7.4 (3.8, 14.2)*	0.5 (0.178, 1.56)
	Tap Water	12	153	1.00	1.00

* refers to significant at binary and multiple logistic regression and significance at p. value<0.05.
** refers to significant at p. value less than 0.001.

The odd of having *H-pylori* infection increased by 6 and 4 fold respectively among study participants who were unable to read and write [AOR]: 6.4 (1.9, 21.3)] and elementary educational status [AOR]: 4.2 (1.3, 13.19)] as compared to those 2ndary school and above in their educational back ground. In addition our study finding also showed that dyspeptic patients whose blood group O 33 times more likely at higher risk of *H. pylori* acquisition as compared those blood group AB individuals [AOR]: 33.4 (5.9, 189.8)].

Our study finding demonstrates that dyspeptic patients who were drunken alcohols 6 times more likely at higher risk of *H. pylori* acquisition as compared to those that did not [AOR]: 6.4 (1.1, 36.6)]. The finding of current study also indicated that dyspeptic patients who were consuming raw fruit and vegetables 6 times more likely *H. pylori* infected as compared to counter parts [AOR]: 6.2 (2.4, 15.7)].

The finding of this study revealed the odd of having *H. pylori* infection increased by 25 fold among dyspeptic patients that had not hand washing habit before meal as compared to those dyspeptic patients that had hand washing habit before meal [AOR]: 24.5 (7.4, 81.6)]. Similarly the current study also showed that dyspeptic patients who were not wash their hand after toilet 4 times more likely at higher risk of *H. pylori* infection as compared to those that did [AOR]: 4.2 (1.3, 13.24)] (Table 3).

4. Discussion

In this study, the overall Feco-prevalence of *Helicobacter pylori* infection among dyspeptic patients accounts for 23.0% (95% CI: 19.1, 27.5). The finding is lower as compared to Brazil 78.8% [17], southern Iranian 67.1% [18], Turkey 82.5% [19], Myanmar 48.0% [20], West Cameroon 43.4% [7], Egyptian 53.1% [21], Tanzania 39.1% [22] and Uganda 36% [23]. Our study also lower compared studies done in Ethiopia like Northwest Ethiopia 72.2% [24], Gondar Hospital 37.6% [25], Deisse referral hospital 30.4%[13], Jinka Zonal Hospital, Debub Omo 50.7% [26] and Addis Ababa 36.8% [16]. This lower prevalence of *H. Pylori* in our study is probably diagnostic method that we employed stool antigen for detection of *H. Pylori* which is highly sensitive and specific unlike that of serological diagnosis employed in most studies indicated above that falsely raises the prevalence. The other possible justification for lower prevalence in our case may be study settings where the majority of the above studies were done at the hospital level where chronic cases of dyspeptic patients were seen but our studies were conducted at public health centres where mild cases of dyspeptic patients attend.

The finding of this study, however, is higher as compared to the study Asella Teaching and Referral Hospital, 15.2% [14] but in line with Toronto of Canada 23.1% [1] and Five Largest Islands of Indonesia 22.1% [27]. The difference in prevalence could be due to differences in testing methods, study period, and variations in the socio-demographic, socioeconomic, environmental, clinical, and behavioural factors of the study subjects.

The odd of having *H-pylori* infection increased by 6 and 4-fold respectively among study participants who were unable to read and write [AOR]: 6.4 (1.9, 21.3)] and elementary educational status [AOR]: 4.2 (1.3, 13.19)] as compared to those 2^{ndary} school and above in their educational background. This finding is in line with that of Ozaydin Et al lower education of subjects who were at high risk of *H. Pylori* infection [19]. Similarly, our study was also in line with Shiferaw and Abera showing families with low educational levels were 4 times more likely to be infected with *H. pylori* infection than a higher level of education [16]. In contrast to our study, a study by Abebaw et al showed participants who had a tertiary level of education had a 2.11 times higher risk of developing *H. pylori* infection compared to those who have no formal education [24]. The probable justification for this could be as educational status gets increased health seeking behaviour and hygiene practice also improves.

Our study demonstrates that dyspeptic patients who were drinking alcohol were 6 times more likely at higher risk of *H. pylori* acquisition as compared to those that did not [AOR]: 6.4 (1.1, 36.6)]. This finding is in agreement with a study by Abebaw et al that compared to those who do not take alcohol, alcohol consumers have a 2.72 times higher chance of infection with *H. pylori* [24]. Unlike our study, a study by Melese et al indicated that Participants who were taking alcohol were 66% less likely to be infected with *H. pylori* infection as compared to those that did not [9]. The plausible justification for this association might due to alcohol is known to directly damage the gastric mucosa layer it is theoretically possible that alcohol provides ways for *H. pylori* infection. In addition, heavy drinking can predispose consumers to social contact that favours the transmission of *H. pylori.*

Our study findings also showed that dyspeptic patients whose blood group O is 33 times more likely at higher risk of *H. pylori* acquisition as compared to those blood group AB individuals [AOR]: 33.4 (5.9, 189.8)]. This finding is in line with the study by Seid and Demsis that shows dyspeptic patients whose blood group O and blood group A were 8 and 6 times at higher risk of *H. pylori* acquisition as compared to those blood group AB individuals [13]. The association of *H. pylori* and blood group O could be related to the expression of carbohydrate receptors of *H. pylori* into gastric tissues in greater quantities among blood group O individuals [13].

The current study revealed the odd of having *H. pylori* infection increased by 25-fold among dyspeptic patients that had not to hand washing habits before the meal as compared to those dyspeptic patients that had hand washing habits before a meal [AOR]: 24. 5 (7.4, 81.6)]. This finding is concordant with the study by Melese et al that Participants who were not washing their hands after the toilet were 2 times more likely to be infected with *H. pylori* as compared to those that wash their hands [9]. Like our study, Getnet also reported that the odds of being infected by *H. pylori* bacteria among individuals who never wash their hands after a toilet is 2.86 times higher than those who wash their hands always after toilet use [26]. Lastly, the finding of the current study also indicated that dyspeptic patients who were consuming raw fruit and vegetables were 6 times more likely *H. pylori* infected as compared to counterparts [AOR]: 6.2 (2.4, 15.7)]. This is probably due to the contamination of vegetables and fruit by environmental bacteria. In addition to fecal/oral transmission of bacteria, contaminated water supplies in developing countries may serve as an environmental source of bacteria [10].

Limitation of study

The study population was only symptomatic patients presented to public health centers which limit actual prevalence of infection and do not totally reflect the true picture of *H. Pylori* prevalence in community.

Being cross sectional study it did not show cause-effect relationships.

At last, it should be considered that the dyspeptic patients, other than stool antigen tests, did not undergo further confirmatory tests on invasive technique (such as histology, culture, polymerase chain reaction and rapid urease test) due to economic constraints.

5. Conclusion and Recommendation

5.1. Conclusion

The overall prevalence of *H. pylori* infection in this study found to be 23.0% using stool antigen tests. Identifiable risk factor associated with infection include: being unable to read and write and elementary educational status, being blood group O and A, drinking alcohol, chat chewing, Eating Raw Vegetables and Fruit, failure of Hand Washing Habit Before Meal and after toilet and drinking non tap water were strong predictor of *H. Pylori* infection.

5.2. Recommendation

Based on our study finding we recommend ministry of health and education of Adama woreda should work together to enrich education to all communities in that woreda as education critical tool in improving major life style factor. We recommend all dyspeptic patients to stop drinking alcohol, stop chewing chat, to avoid consumption of uncooked vegetables and fruit, to wash their hands frequently after toilet and before meal and to stop drinking of non-tap water. We recommend Adama woreda health office to improve sanitary condition of the environment and water to decrease the prevalence of *H. pylori.* Last not least we invite other researchers, to undergo this study by invasive technique (such as histology, culture, polymerase chain reaction and rapid urease test) and on large sample size.

Author Contributions

Legese Lemma: Conceptualization, Methodology Data entry, analysis, interpretation and Writing –original draft.

Yohannes Beneberu: Data collection and Laboratory Investigation.

Girma Mulisa: Writing –review & editing of manuscript.

Compliance with Ethical Standards

Conflict of Interest

The authors declare that they have no competing interests.

Financial Disclosure

All the expense for this original study was covered by principal investigators.

Ethics Approval

Ethical Approval was obtained from Riftvalley University, Adama woreda Health Office.

Acknowledgements

We sincerely express our gratitude to GOD, the almighty, for giving us health, courage and wisdom to undertake and pursue these studies. We would also to thank Rift Valley University for allowing us to overcoming of numerous obstacles we have been facing during our study. We would also like to extend our appreciation to the study participants, supervisors and data collectors.

References

[1] Naja F, Kreiger N, Sullivan T. Helicobacter pylori Infection in Ontario: Prevalence and Risk Factors. Can J Gastroenterol. 2007; 21 (8): 501–6.

[2] Thaker Y. Helicobacter Pylori: A Review of Epidemiology, Treatment, and Management. J Clin Gastroenterol Treat [Internet]. 2016 Jun 30 [cited 2021 May 23]; 2 (2). Available from: https://clinmedjournals.org/articles/jcgt/journal-of-clinical-gastroenterology-and-treatment-jcgt-2-019.php?jid=jcgt

[3] Borges SS, Ramos AFPL, Moraes Filho AV de, Braga CA da SB, Carneiro LC, Barbosa MS. [ARTICLE PARTIAL RETRACTION] PREVALENCE OF HELICOBACTER PYLORI INFECTION IN DYSPEPTIC PATIENTS AND ITS ASSOCIATION WITH CLINICAL RISK FACTORS FOR DEVELOPING GASTRIC ADENOCARCINOMA. Arq Gastroenterol. 2019 Mar; 56 (1): 66–70.

[4] Akushe TN, Asmah RH, Wiredu EK, Gyasi RK, Nkrumah KN, Rajakumar K. Epidemiology of Helicobacter pylori infection in dyspeptic Ghanaian patients. Pan Afr Med J [Internet]. 2015 [cited 2021 May 23]; 20. Available from: http://www.panafrican-med-journal.com/content/article/20/178/full/

[5] Feldman RA, Eccersley AJP, Hardie JM. Epidemiology of Helicobacter pylori: acquisition, transmission, population prevalence and disease-to-infection ratio. Br Med Bull. 1998 Jan 1; 54 (1): 39–53.

[6] Hooi JKY, Lai WY, Ng WK, Suen MMY, Underwood FE, Tanyingoh D, et al. Global Prevalence of Helicobacter pylori Infection: Systematic Review and Meta-Analysis. Gastroenterology. 2017 Aug; 153 (2): 420–9.

[7] Agbor NE, Esemu SN, Ndip LM, Tanih NF, Smith SI, Ndip RN. Helicobacter pylori in patients with gastritis in West Cameroon: prevalence and risk factors for infection. BMC Res Notes. 2018 Dec; 11 (1): 559.

[8] Rodrigues MN, Queiroz DMM, Rodrigues RT, Rocha AMC, Braga Neto MB, Braga LLBC. Helicobacter pylori infection in adults from a poor urban community in northeastern Brazil: demographic, lifestyle and environmental factors. Braz J Infect Dis. 2005 Oct; 9 (5): 405–10.

[9] Melese A, Genet C, Zeleke B, Andualem T. Helicobacter pylori infections in Ethiopia; prevalence and associated factors: a systematic review and meta-analysis. BMC Gastroenterol. 2019 Dec; 19 (1): 8.

[10] Negash M, Wondifraw Baynes H, Geremew D. Helicobacter pylori Infection and Its Risk Factors: A Prospective Cross-Sectional Study in Resource-Limited Settings of Northwest Ethiopia. Can J Infect Dis Med Microbiol. 2018 Oct 18; 2018: 1–7.

[11] Dang BN, Graham DY. Helicobacter pylori infection and antibiotic resistance: a WHO high priority? Nat Rev Gastroenterol Hepatol. 2017 Jul; 14 (7): 383–4.

[12] Elamin EAI, Suliman MA, Azoz ME, Ali EW, Olerile LD, Jiao Y, et al. Effect of Helicobacter pylori Infection on Haematological Parameters in Kosti Teaching Hospital, Sudan. Iran Red Crescent Med J [Internet]. 2018 Feb 24 [cited 2021 Jan 20]; 20 (2). Available from: https://sites.kowsarpub.com/ircmj/articles/58276.html

[13] Seid A, Demsiss W. Feco-prevalence and risk factors of Helicobacter pylori infection among symptomatic patients at Dessie Referral Hospital, Ethiopia. BMC Infect Dis. 2018 Dec; 18 (1): 260.

[14] Getachew Mesfun M. Five Years Trend of *Helicobacter pylori* Infection Among Dyspeptic Patients in Asella Teaching and Referral Hospital, Arsi University, Ethiopia. Sci J Clin Med. 2018; 7 (5): 37.

[15] Kifle D, Azale T, Gelaw YA, Melsew YA. Maternal health care service seeking behaviors and associated factors among women in rural Haramaya District, Eastern Ethiopia: a triangulated community-based cross-sectional study. Reprod Health. 2017 Dec; 14 (1): 6.

[16] Shiferaw G, Abera D. Magnitude of Helicobacter pylori and associated risk factors among symptomatic patients attending at Jasmin internal medicine and pediatrics specialized private clinic in Addis Ababa city, Ethiopia. BMC Infect Dis. 2019 Dec; 19 (1): 118.

[17] Almeida Cunha RP, Alves FP, Rocha AMC, Rocha GA, Camargo LMA, Nogueira POP, et al. Prevalence and risk factors associated with Helicobacter pylori infection in native populations from Brazilian Western Amazon. Trans R Soc Trop Med Hyg. 2003 Jul; 97 (4): 382–6.

[18] Hashemi MR. H pylori infection among 1000 southern Iranian dyspeptic patients. World J Gastroenterol. 2006; 12 (34): 5479.

[19] Ozaydin N, Turkyilmaz SA, Cali S. Prevalence and risk factors of helicobacter pylori in Turkey: a nationally-representative, cross-sectional, screening with the 13C-Urea breath test. BMC Public Health. 2013 Dec; 13 (1): 1215.

[20] Myint T. Prevalence of Helicobacter pylori infection and atrophic gastritis in patients with dyspeptic symptoms in Myanmar. World J Gastroenterol. 2015; 21 (2): 629.

[21] Department of Microbiology, Theodor Bilharz Research Institute, Giza, Egypt., Diab M, Shenawy A, Department of Microbiology, Theodor Bilharz Research Institute, Giza, Egypt., Shemis M, Department of Biochemistry, Theodor Bilharz Research Institute, Giza, Egypt, et al. HELICOBACTER PYLORI INFECTION IN EGYPTIAN PATIENTS WITH DYSPEPSIA: DIAGNOSTIC, DEMOGRAPHIC, ENDOSCOPIC AND CLINICAL CHARACTERISTICS. Int J Adv Res. 2018 Jun 30; 6 (6): 226–34.

[22] Jaka H, Mushi MF, Mirambo MM, Wilson L, Seni J, Mtebe M, et al. Sero-prevalence and associated factors of Helicobacter pylori infection among adult patients with dyspepsia attending the gastroenterology unit in a tertiary hospital in Mwanza, Tanzania. Afr Health Sci. 2016 Oct 17; 16 (3): 684.

[23] Oling M, Odongo J, Kituuka O, Galukande M. Prevalence of Helicobacter pylori in dyspeptic patients at a tertiary hospital in a low resource setting. BMC Res Notes. 2015 Dec; 8 (1): 256.

[24] Abebaw W, Kibret M, Abera B. Prevalence and Risk Factors of *H. pylori* from Dyspeptic Patients in Northwest Ethiopia: A Hospital Based Cross-sectional Study. Asian Pac J Cancer Prev. 2014 Jun 15; 15 (11): 4459–63.

[25] Kasew D, Abebe A, Munea U, Deressa T, Tegegne Y, Alemayehu M, et al. Magnitude of Helicobacter pylori among Dyspeptic patients attending at University of Gondar Hospital, Gondar, Northwest Ethiopia. Ethiop J Health Sci. 2017 Nov 6; 27 (6): 571.

[26] Getnet Hailu H. Prevalence and Risk Factors of Helicobacter pylori among Adults at Jinka Zonal Hospital, Debub Omo Zone, Southwest Ethiopia. Autoimmune Infect Dis Open Access ISSN 2470-1025 [Internet]. 2016 [cited 2021 May 23]; 2 (2). Available from: https://www.sciforschenonline.org/journals/autoimmune-infectious/AIDOA-2-113.php

[27] Syam AF, Miftahussurur M, Makmun D, Nusi IA, Zain LH, Zulkhairi, et al. Risk Factors and Prevalence of Helicobacter pylori in Five Largest Islands of Indonesia: A Preliminary Study. Ahmed N, editor. PLOS ONE. 2015 Nov 23; 10 (11): e0140186.