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ORIGINAL ARTICLE

Helicobacter Pylori Infection and Iis Associated Factors Among Adult Clients Attending out-Patient Department in Shashemene Comprehensive Specialized Hospital, Shashemene Town, Southern Ethiopia

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Abstract

Background: Helicobacter pylori infection is a major public health problem with 50% of the global population infected. Millions of people develop the peptic ulcerative disease in their lifetime and many may progress into gastric cancer. It is endemic to developing countries, including Ethiopia.

Objective: To assess the prevalence of H. pylori infection & its associated factors among dyspeptic & non-dyspeptic adult Clients.

Materials and Methods: A cross-sectional institutional study involving 423 adult clients attending OPD at Shashemene Comprehensive Hospital was conducted from March 3 to April 15, 2021. Data for risk factors were assessed through a structured questionnaire. About 50 mg fresh stool and 1ml of total venous whole blood sample were taken for H. pylori antigen using Wondfo feces test kit & blood, respectively. Data were analyzed by SPSS of version 22. Both bivariate and multivariable logistic regression analyses were carried out to identify the significant variable with a cut-off p-value of less than 0.05.

Results: A total of 423 participants were interviewed giving a response rate of 100%. The mean (± SD) age of respondents was 35.6 (± 10.75) years. The magnitude of H. Pylori infection among participants was 26.7% with 95%CI (22.9, 31.2). Participants who had no formal education (AOR=3.25, CI 95% =1.49-7.04), alcohol consumption (AOR=4.54, CI 95%= 2.41-8.52), family size with ≥6 siblings (AOR= 6.14, CI 95% = 3.21-11.74), dyspepsia (AOR=2.34, CI 95% =1.18-4.61), uncooked food consumption (AOR=2.89, CI 95% =1.24-6.76), and highly perceived stress level participant (AOR= 8.87, CI 95% = 3.95-9.93) were significantly associated with H. Pylori infection

Conclusion: The overall prevalence is high in the study area, where one in four patients were being infected. The study showed significant association of different factors mentioned in results, The results also indicated that the bacterium is common in healthy individuals and is still a public health concern that needs further investigation by future researchers.

Key Words: H. Pylori, Stool Ag test, Risk factors, Adult, Shashemene, Ethiopia

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Introduction

The escalating rates of caesarean section deliveries is one of the major causes of concern across all geographical regions[1].Evidence shows that this rapid rise in CSR is directly proportional to maternal &/or neonatal morbidity and mortality, showing that perhaps CS delivery is conducted where it is not really needed[2].

Before Warren and Marshall, the human stomach was believed to be a sterile area, and H. Pylori was previously named Campylobacter pylori, later on, the isolates analyzed were confirmed different from the true campylobacters & subsequently qualified into a new genus Helicobacter3. Today, H. pylori are recognized as the most common cause of gastritis & additionally, the organism is classified as a class one carcinogen because of its causal relationship to gastric adenocarcinoma, one of the world's deadliest cancers[2,4]. Helicobacter pylori infection is mostly asymptomatic in its carriers, but when it affects human health, gastritis, gastric ulcers, and duodenal ulcers can be induced. The infection is one of the most common chronic bacterial infections of humans and has a worldwide distribution2 .As a result, long-term colonization of H. pylori can damage the gastric mucosa causing various diseases of the upper gastrointestinal tract such as chronic gastritis, peptic ulcer, & gastric malignancies, particularly gastric cancer &Mucosa-Associated Lymphoid Tissue (MALT) lymphoma[1,5].

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The infection is usually acquired in childhood and persists throughout life by causing disease mainly in adults but in children, the consequences of H. pylori infection in gastro duodenal diseases are not well understood; the majority have no specific symptoms and peptic ulcer disease is relatively common in adult individuals[6].

Recent Epidemiological studies suggested that an overall decrease with the prevalence of about 44.3% (95% CI: 40.9-47.7) of the world's populations are colonized by H. pylori. This rate ranged from 50.8% in developing countries compared with 34.7% in developed countries, while the prevalence in adults (≥18 years) was significantly higher than in children[7].

The geographical distribution of H. pylori shows a higher prevalence in the developing countries when compared to the developed countries, with a majority of countries in Africa7. Besides the infection is expected to be common in children, the recent worldwide prevalence of infection is higher in adults. Africa had the highest rate of H pylori infection with 70.1%, followed by South America & Western Asia of 69.4% and 66.6%, respectively with Nigeria the highest H. pylori prevalence from this continent[8-9].

Previously WHO has described the three routes of transmission from the stomach of one person to that of another. These were iatrogenic, person-to-person transmission by either the fecal-oral or oral-oral route10. Even though the route by which infection occurs remains unknown specifically, some studies reveal that the infection is transmitted by fecal-oral route through contaminated water & food, while also Lack of proper sanitation, basic hygiene, poor diets, and overcrowding has been found to play a significant role in H.pylori infection[9,10].

In Ethiopia, although the trend of infection showed a decreasing pattern, still there is evidence of association with the absence of hand washing after the toilet, alcohol consumption, and gastrointestinal (GI) symptoms. The recent prevalence of H. pylori infection remains high with more than half of Ethiopians infected[12].

Therefore, early information is very important to prevent upper gastrointestinal complications. Consequently, the current study aimed to assess the magnitude and associated risk factors of Helicobacter.

Material and Method

This study was conducted among all adult clients who attended OPD health services at Shashemene comprehensive specialized hospital from March to April 2021. Shashemene comprehensive specialized hospital is found in Oromia regional state, in Shashemene town, 238km to the South of Addis Ababa, Ethiopia. Major departments served include outpatient (5 adult OPD case teams), inpatient, and referral clinic services for the approximately 2,907,481 people in the West Arsi and surrounding zones catchment population.

Study design and Population:

A facility-based cross-sectional study design was conducted among all adult clients whose age >18 years gave stool and blood specimens, who did not take infection within the last two months, and who attended health care services at a randomly selected OPD of Shashemene Comprehensive Specialized Hospital.

Methods of Sampling:

For this study, we calculated two sample sizes based on the objective of interest and we selected the highest sample size for this study. For the first objective, we determined the sample size by using a single population proportion formula considering the following assumptions: Proportion (P) of overall prevalence 48.7 % is taken from a similar study conducted among dyspepsia & non-dyspepsia adult individuals at Assosa General Hospital, Western Ethiopia 13 with 5% margin error(d) and confidence interval of 95% (Z α/2= 1.96). Based on this assumption, the sample size was 384 calculated with the formula as follows $n = \frac{(z_{\alpha/2})^2 p(1-p)}{d^2}$. For the second objective, we used double proportion formula based on the adjusted odds ratio (AOR) of significant variables of the previous study by using EPi-Info 7 statistical software, with power 80%, 95% CI. Based on this assumption, we used previous study prevalence; i.e., presence of dyspepsia, gender, types of toilets, source of drinking water, alcohol consumption We found a calculated sample size of 384, 198,186, 104, 160 & 348 with a proportion of exposed to unexposed of 1:1, respectively. Finally, Since, the sample size calculated from the single population proportion formula is the highest of all, with the addition of 10% non-response the final sample size was 423. Regarding the sampling process, first, the total number of adult OPD (5) who are actively working was determined. Next, an average number of adult patient attendants from the one-month data of the last year of the same period in all five adult OPDs which is (4816) were identified. Then, all five adult OPDs were selected and Population Proportion to sample Size sampling technique was applied to determine the number of adult clients per each adult OPD until the number of sample study subjects was fulfilled. Then, systematic random sampling techniques were used to select four hundred twenty-three (423) adult clients randomly for this study. Then, considering eligibility criteria, trained nurses at each OPD sent clients every 11th interval to the central laboratory after they were clerked by providing a special code only designed for the study in their lab request. Finally, the interview was conducted sequentially by a laboratory technologist at the central laboratory after both blood & stool sample was taken for testing.

Data collection:

An interviewer-administered questionnaire adapted from different kinds of literature was used after the specimen was collected to assess independent variables like socio-demographic characteristics, Hygiene practice, health-related, behavioral & sanitary facility-related factors. Five B.Sc. Nurses were used as a facilitator of clients sent to the OPD laboratory, while two B.Sc. Laboratory Technologists were assigned for collecting 1ml of the venous blood sample & Stool specimens using clean, dry, leak-proof, and wide-mouthed

containers. The other senior laboratory technologist was used as a data collector after the sample was given & additionally monitored all ongoing activities. The dietary intake of the study participants was assessed using a 24-hour recall questionnaire prepared from nine food groups based on FAO guidelines11. Regarding laboratory investigation, H. pylori antigen was detected against a test strip that utilized a monoclonal anti-H. pylori antibody conjugate based on a lateral flow chromatographic immunoassay technique. The stool sample was transferred to a vial with diluents, vigorously agitated, and after two minutes of resting the tube, dropping around two to three drops (80 microliters) into the round window of the test cassette. Reading was made after 10 minutes of incubation at room temperature, and based on the appearance of colored lines across the central window of the cassette, two lines, C (control) and T (test) indicate a positive test, only one line in C indicates a negative result. A pale-colored line in T was also considered positive. Specimens were tested using a stool antigen test strip (Zhejiang Orient Gene Biotech CO., LTD, China) with 99.1% sensitivity and 96.6% specificity, according to the manufacturer's instruction19. Additionally, 1ml of venous whole blood sample in ethylene diamine tetra acetic acid (EDTA) anticoagulant coated tube was collected aseptically for each participant and then blood grouping & Rh typing was performed.

Data Quality control:

An interviewer-administered questionnaire was prepared first in English and translated into Afan Oromo and then retranslated back to English by language experts to ensure consistency. Then, the study participants were interviewed in a local language, Afan Oromo. To ensure quality control 5% of the structured questionnaire was pre-tested in line with laboratory procedures before actual data collection at Melka Oda General Hospital & modification was applied based on pretest result. Concerning the quality of sample collection & laboratory procedure, the H. Pylori test kit has coated inbuilt quality control on the lateral surface for easy monitoring. On the other way, to further ensure the quality, stool sample has to be collected with a new container of long expiry date & all contents in the developed standard operating procedure (SOP) has to be followed properly from pre-analytical to post-analytical. One day of intensive training before the actual work related to research activities was given by investigators and experienced laboratory technologists on data collection principles and laboratory procedures. Overall, the investigator and supervisors check the completeness and clarity of each questionnaire on daily basis. They also monitor the activities of each data collector by random spot-checking of the individual data collection process of a given sample to ensure the reliability of the data. Any error, ambiguity, incompleteness, or any other test kit problems related were addressed on the following day before starting the next day's activities.

Data processing and analysis:

All collected data were checked, coded, and entered into Epidata 4.4.2.1 and exported to SPSS windows version 22 for cleaning, categorization, and analysis. Descriptive analysis of categorical variables was computed to see frequency distribution by graphs & tables, while bivariate binary logistic analyses were used to test whether there is an association between each independent variable and outcome variable. Then, factors seen to be associated with H. Pylori were selected during bivariate binary logistic analysis with a value of $p \leq 0.25$ were entered into multivariable binary logistic regression indeed analysis was done by using the forward method. During multivariable analysis, model fitness was checked using the Hosmer-Lemeshow`s goodness of fitness test ($p = 0.482$), multi-collinearity among independent variables not seen while variance inflation factor (VIF) was used to assess the problem. All tests were two-sided & variables with P-value less than 0.05 at a 95% confidence interval with a certain adjusted odds ratio (AOR) were considered as statistically significant.

Results

Socio-Demographic Characteristics of the Respondents:

A total of four hundred twenty-three (423) adult OPD clients enrolled with a 100% response rate. Among study participants 233(55.1%) respondents were male and about 36.9% of the study participants fell in the age group of 25–34 years with a mean (±SD) age of 35.6 ± 10.75 years. Of the total respondents, 314 (74.2%) of them were from urban residents, 131(31.0%) were had primary (grade 1-8) of pylori infection among adult patients attending Shashemene comprehensive specialized hospital, Southeast Ethiopia. educational level, 269(63.6%) of Oromo ethnic group & 123 (29.1%) of them were a farmer about occupational Status (Table 1).his study found that 326(77.1%) of the study participants used tap water for drinking, 386(91.3%) had toilet in their home with majority while, 262(67.9%) of them used pit latrine type. Study respondents 305 (72.1%) had no family history of H. pylori infections, about 254(60.0 %) of the study participants came up with complaint of dyspepsia, while majority 383(90.5%) of them practiced consuming cooked food in their home & more than half of the participants 215 (50.8%) had history of using NSAIDs during the last month (Table 2).

Magnitude of H. Pylori Infection

The overall prevalence of H. pylori infection was 113 (26.7%) through Stool Antigen detection. Of the positives, the prevalence of H. pylori infection higher in occupationally farmers123(29.1%). A high proportion of H. pylori stool antigen positive cases, 62(54.9%),83(26.7%) & 61/170(35.9%) were found among participants with a household family size of ≥6, who had shared-bed with their siblings & had poor hand washing practice, respectively (Figure 2, Table 1 and Table 2).

Regarding the Magnitude of H. Pylori infection among participants who had complained dyspepsia clinical sign & symptom (n=270), ninety-two (34.1%) of them were positive for H. Pylori.

Table 1: Socio-Demographic Characteristics of the study participants who attended the adult OPD Service at Shashemene Comprehensive Hospital, Ethiopia, 2021(n = 423)				
Variables	Description	Frequency N (%)	H. Pylori Stool Ag test status	
			Positive (%)	Negative (%)
Age (Year)	18 – 24 years	52 (12.3)	12(23.1)	40(76.9)
	25 – 34 years	156(36.9)	42(26.9)	114(73.1)
	35 – 44 years	135(31.9)	42(31.1)	93(68.9)
	≥ 45 years	80(18.9)	17(21.2)	63(78.8)
		Mean ± SD =35.6 ± 10.75 year		
Sex	Male	233(55.1)	62(26.6)	171(73.4)
	Female	190(44.9)	51(26.8)	139(73.2)
Marital status	Single	110(26.0)	30(27.3)	80(72.7)
	Married	280(66.2)	72(25.7)	208(74.3)
	Divorced	21(5)	6(28.6)	15(71.4)
	Widowed	12(2.8)	5(41.7)	7(58.3)
Religion	Orthodox	117(27.7)	29(24.8)	88(75.2)
	Protestant	107(25.3)	25(23.4)	82(76.6)
	Muslim	171(40.4)	54(31.6)	117(68.4)
	Catholic	10(2.4)	2(20.0)	8(80.0)
	Others*	18(4.3)	3(16.7)	15(83.3)
Residence	Urban	314(74.2)	87(27.7)	227(72.3)
	Rural	109(25.8)	26(23.9)	83(76.1)
Ethnicity	Oromo	269(63.6)	61(22.7)	208(77.3)
	Amhara	51(12.1)	17(33.3)	34(66.7)
	Wolayta	43(10.2)	15(34.9)	28(65.1)
	Sidama	28(6.6)	8(28.6)	20(71.4)
	Others*	32(7.6)	12(37.5)	20(62.5)
Family size of participant >6	No	311(73.3)	51(16.4)	259(83.4)
	Yes	113(26.7)	62(54.9)	51(45.1)
Shared Bed with sibling	No	112(26.5)	29(25.9)	83(74.1)
	Yes	311(73.5)	83(26.7)	227(73.3)
Educational Status	No Formal education	55(13.0)	22 (40.0)	33 (60.0)
	Formal educations	368(87)	91(24.7)	277 (75.3)
Occupation	Farmer	123(29.1)	38(30.9)	85(69.1)
	Government	94(22.2)	18(19.1)	76(80.9)
	Private Employee	81(19.1)	19(23.5)	62(76.5)
	Daily Laborer	68(16.1)	19(27.9)	49(72.1)
	Merchant	50(11.8)	15(30.0)	35(70.0)
	Other	7(1.7)	4(57.1)	3(42.9)
Family Monthly Income	< 1000 EBR	163(32.2)	46(33.8)	90(66.2)
	1000-2000	172(24.3)	27(26.2)	76(73.8)
	2001 – 3000	48(18.7)	22(27.8)	57(72.2)
	3001 – 4000	31(12.3)	5(9.6)	47(90.4)
	≥ 4001 EBR	53(12.5)	13(24.5)	40(75.5)
Livestock availability	No	225(53.2)	58(25.8)	167(74.2)
	Yes	198(46.8)	55(27.8)	143(72.2)
Note: Others* - Jovha Witness, Wakefeta, and Adventist religion followers				

Table 2:Health & dietary characteristics of participants who attended the adult OPD Service at Shashemene Comprehensive Hospital, Ethiopia, 2021 (n = 423)				
Variables	Description	Frequency (%)	H. Pylori Stool Ag test status	
			Positive	Negative (%)
Drinking-Water Source	Tap water	326(77.1)	90 (27.6)	236 (72.4)
	Bottled water	46(10.9)	12(26.1)	34(73.9)
	Boiled tap water	16(3.8)	2(12.5)	14(87.5)
	Mineral water	35(8.3)	9(25.7)	26(74.3)
Availability of Toilet	No	37(8.7)	10(27.0)	27(73.0)
	Yes	386(91.3)	103(26.7)	283(73.3)
Type of toilet used in the house (n=386)	Pit latrine	262(67.9)	65(26.8)	187(73.2)
	Flush toilet	111(28.8)	29(27.6)	82(72.4)
	Others	23(3.3)	10(43.5)	13(56.5)
Handwashing with soap after toilet use	No	170(40.0)	109(25.8)	61(14.4)
	Yes	253(60.0)	201(47.5)	52(12.3)
Family History of H. pylori infection	No	305 (72.1)	72(17.1)	233(55.1)
	Yes	118(27.9)	41(9.7)	77(18.1)
Types of eaten food	Uncooked (Raw)	40(9.5)	23(57.5)	17(42.5)
	Cooked	383(90.5)	70(18.3)	313(81.7)
Food preservation	No	114(27.0)	18(15.8)	96(84.2)
	Yes	309(73.0)	54(17.5)	255(82.5)
Duration of time taken prior consumption after preparation (n=309)	One day	115(35.9)	24(20.9)	91(79.1)
	2 – 3 days	167(54.0)	47(28.1)	120(71.9)
	4 – 7 days	31(10.0)	8(25.8)	23(74.2)
Method of food preservation (n=309)	Refrigerator	149(48.2)	38(25.5)	111(74.5)
	Other preservation	160(51.8)	40(25.0)	120(75.0)
Dyspepsia status	Dyspepsia	270(63.8)	92(34.1)	178(65.9)
	Non-Dyspepsia	153(36.2)	21(13.7)	132(86.3)
History of NSAID used in the last month	No	208(49.2)	50(24.1)	158(75.9)
	Yes	215(50.8)	63(29.3)	152(70.7)
Kinds of NSAID used in the last month (n=215)	Diclofenac	129(60.0)	40(30.1)	89(68.9)
	Ibuprofen	73(34.0)	20(27.4)	53(72.6)
	Indomethacin	12(5.5)	3(25.0)	9(75.0)
	Aspirin (ASA)	1(0.5)	0(0)	1(100.0)

infection, Whereas, among those participants who did not have a complained dyspepsia clinical sign & symptom (i.e., non-dyspeptic) (n=153), twenty-one (13.7%) of the participants were positive for H. Pylori Infection (Figure 1)

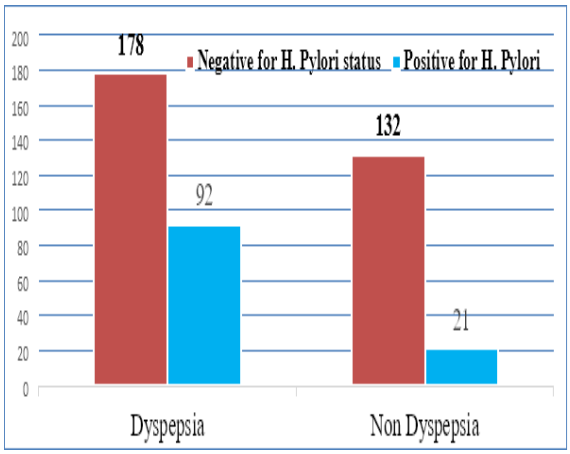

Figure 1: **Magnitude of H. Pylori infection among clinical sign & symptom of the study participants**

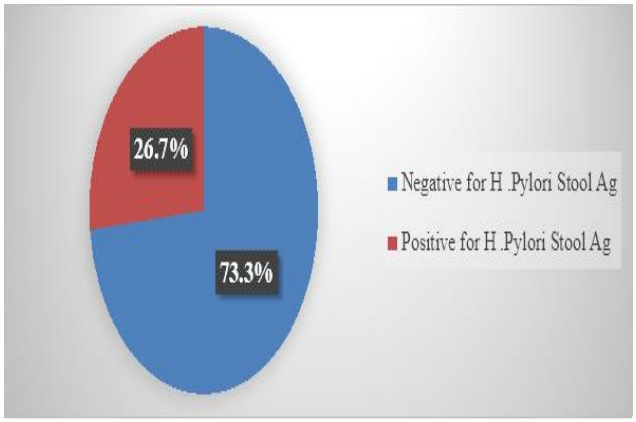

Figure 2: Magnitude of H. Pylori among study participants who attended the adult OPD

Behavioral characteristics:

The proportion of alcohol consumer at least once a week and cigarette smoker accounted for 37/51(72.5%) and 9/28 (32.1%) of the studypopulation respectively. An assessment of study Participants brought out had habit of chewing khat 36/79(45.6%) for more than two years &

Table 3: Behavioral characteristics of the study participants who attended the adult OPD Service at Shashemene Comprehensive Hospital, Ethiopia, 2021 (n = 423)				
Variable	Categories	Frequency N (%)	H. Pylori Stool Ag test status	
			Positive (%)	Negative (%)
Chew Khat	No	344(81.1)	77(22.4)	267(77.6)
	Yes	79(18.9)	36(45.6)	43(54.4)
Duration of khat chewing (n=79)	<3 years	5(7.5)	1(20.0)	4(80.0)
	≥ 3 years	74(92.5)	35(47.3)	39(52.7)
Drink Alcohol	No	304(71.9)	49(16.1)	255(83.9)
	Yes	119(28.1)	64(53.8)	55(46.2)
Kinds of alcohol usually used (n=119)	Beer	50(42.0)	23(46.0)	27(54.0)
	Wine	40(22.6)	24(60.0)	16(40.0)
	Local Drink	24(20.2)	15(62.5)	9(37.5)
	Industry Areke	5(4.2)	2(40.0)	3(60.0)
Frequency of alcohol consumption	One time per month/less	32(26.9)	11(34.4)	21(65.6)
	2–3 times per month	21(17.6)	7(33.3)	14(66.7)
	2 –3 times per week	15(12.6)	9(60.0)	6(40.0)
	4 or more times/week	51(42.9)	37(72.5)	14(27.5)
Duration of alcohol intake	< 2 years	25(21.0)	7(28.0)	18(72.0)
	≥ 2 years	94(79.0)	57(60.6)	37(39.4)
Tea intake	No	221(52.2)	64(28.9)	157(71.1)
	Yes	202(47.8)	49(24.4)	152(75.6)
Frequency of tea intake in a day (n=202)	Sometimes	152(76.4)	29(19.1)	123(80.9)
	Always	50(23.6)	14(28.0)	36(72.0)
Coffee intake	No	48(11.3)	8(16.7)	40(83.3)
	Yes	375(88.7)	105(28.0)	270(72.0)
Frequency of Coffee Intake (n=375)	Sometimes	54(14.4)	15(27.7)	39(72.3)
	Always	321(85.6)	90(28.1)	231(71.9)
Cigarettes Smoking	No	395(93.4)	94 (23.8)	301(76.2)
	Yes	28 (6.6)	9 (32.1)	19 (67.9)
Frequency of cigarette smoking per packet (n=28)	4 or more times per week	12(42.9)	4(33.3)	8(66.7)
	2 – 3 times per week	7(25.0)	3(42.9)	4(57.1)
	2 – 3 times per month	3(10.7)	1(33.3)	2(67.3)
	<= one times per month	6(21.4)	3(50.0)	3(50.0)
Soft drink consumption	No	197(46.6)	62(31.5)	135(68.5)
	Yes	226(53.4)	51(22.6)	175(77.4)

105(28.0%) had habit of drinking coffee at least once a day (Table 3).

Dietary Intake and Diversity statusAmong all study participants 423, the majority 253(59.8%) had low dietary Diversity (i.e., a food prepared from less than four food groups), while 170(40.2%) of the adults had high or optimum dietary diversity status (Figure 3)

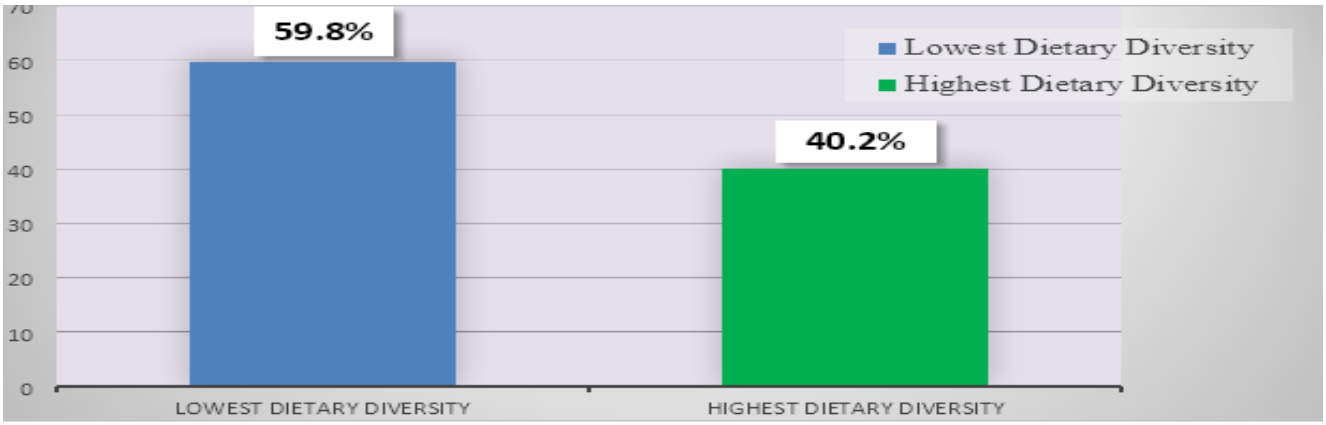

***Figure 3*: High and low dietary diversity Status of the study participants who attended the adult OPD service at Shashemene**

Table 4: Output of multivariate binary logistic regression analysis of factors associated with the magnitude of H. pylori among adult OPD clients seeking health Service at Shashemene comprehensive specialized Hospital, Southern Ethiopia, 2021 (n = 423)

Variables	Category	H. Pylori Status		COR (95%CI)	AOR (95%CI)	P-value
		Positive (%)	Negative (%)			
Formal Education	No	22 (40.0)	33 (60.0)	2.03(1.12, 3.66)	3.25(1.49, 7.04)	0.003**
	Yes	91(24.7)	277 (75.3)	1.00+	1.00+	
Family History	No	41(34.7)	77 (65.3)	1.72(1.09, 2.74)	1.86(0.92, 3.77)	0.086
	Yes	72(23.6)	233(76.4)	1.00+	1.00+	
Dyspepsia status	Dyspepsia	92(34.1)	178(65.9)	3.45(2.02, 5.88)	2.34(1.18, 4.61)	0.015*
	Non-Dyspepsia	21 (13.7)	132 (86.3)	1.00+	1.00+	
Family Size	≥ 6	51(16.4)	259(83.4)	6.12(3.83, 9.95)	6.14(3.21, 11.74)	0.001***
	< 6	62(54.9)	51(45.1)	1.00+	1.00+	
Types of used food	Raw (Uncooked)	23(57.5)	17(42.5)	1.75(1.13, 2.31)	2.89(1.24 6.76)	0.014**
	Yes (Cooked)	70(18.3)	313(81.7)	1.00+	1.00+	
Hand washing after toilet	No	109(25.8)	61(14.4)	1.72(1.39, 3.35)	1.00+	0.164
	Yes	201(47.5)	52(12.3)	1.00+	0.65(0.35, 1.19)	
Alcohol use	Yes	64 (53.8)	55(46.2)	6.06(3.78, 9.71)	4.54(2.41, 8.52)	0.001***
	No	49(19.2)	255(80.8)	1.00+	1.00+	
Khat Chewing History	Yes	36(45.6)	43(54.4)	2.90(1.74, 4.84)	1.56(0.74, 3.29)	0.242
	No	77(22.4)	267(77.6)	1.00+	1.00+	
Coffee intake	Yes	105(28.0)	270(72.0)	1.94(0.88, 4.29)	2.50(0.80, 7.76)	0.112
	No	8(16.7)	40(83.3)	1.00+	1.00+	
Preservation of food	Yes	18(15.8)	96(84.2)	0.89(0.45, 1.15)	1.32(0.66, 2.64)	0.428
	No	54(17.5)	255(82.5)	1.00+	1.00+	
NSAID used in the last month	Yes	63(29.3)	152(70.7)	1.31(0.85, 2.02)	0.54(0.28, 1.03)	0.063
	No	50(24.1)	158(75.9)	1.00+	1.00+	
Blood Types	A	29(25.9)	83(74.1)	1.00+		0.255
	AB	9(13.2)	59(86.8)	0.44(0.19, 0.99)	0.83(0.29, 2.41)	0.737
	B	32(31.1)	71(68.9)	1.29(0.71, 2.34)	1.29(0.55, 2.99)	0.558
	O	43(30.7)	97(69.3)	1.27(0.73, 2.21)	1.93(0.89, 4.19)	0.096
Perceived stress scale status	High stress	67(67.7)	32(32.3)	11.6(6.07, 22.1)	8.87(3.95, 19.93)	0.001***
	Moderate Stress	27(13.5)	173(86.5)	0.86(0.46, 1.63)	0.66(0.31, 1.39)	0.655
	Low stress	19(15.3)	105(84.7)	1.00+		0.001***

Note: *p ≤0.05; **p≤0.01; ***p≤0.001 1.00+ Reference category Abbreviation: CI: Confidence interval COR: Crude odd ratio AOR: Adjusted Odd Ratio

Family size of respondents who had greater than six siblings in a single house (≥ 6) were six times more exposed H. pylori infections than who had less than six siblings in a single house (AOR=6.14: 95%CI (3.21, 11.74)) and participants who had consumed raw(uncooked) food were three times more to become infected by H. Pylori than respondents who use cooked foods during the study period (AOR= 2.894: 95%CI (1.240 6.758) (Table 4). Who had formal educations (AOR=3.25: CI (1.49, 7.04). Participants who had frequently consumed alcohol (>once/week) is four (4) times were at risk of developing infection H. pylori infection (AOR=4.54: 95%CI (2.41, 8.52)). Moreover, participants who were highly perceived stress were eight times more likely to be infected by H. pylori than clients with slightly low perceived stress (AOR= 8.87: 95%CI (3.95, 19.93) (Table 4).

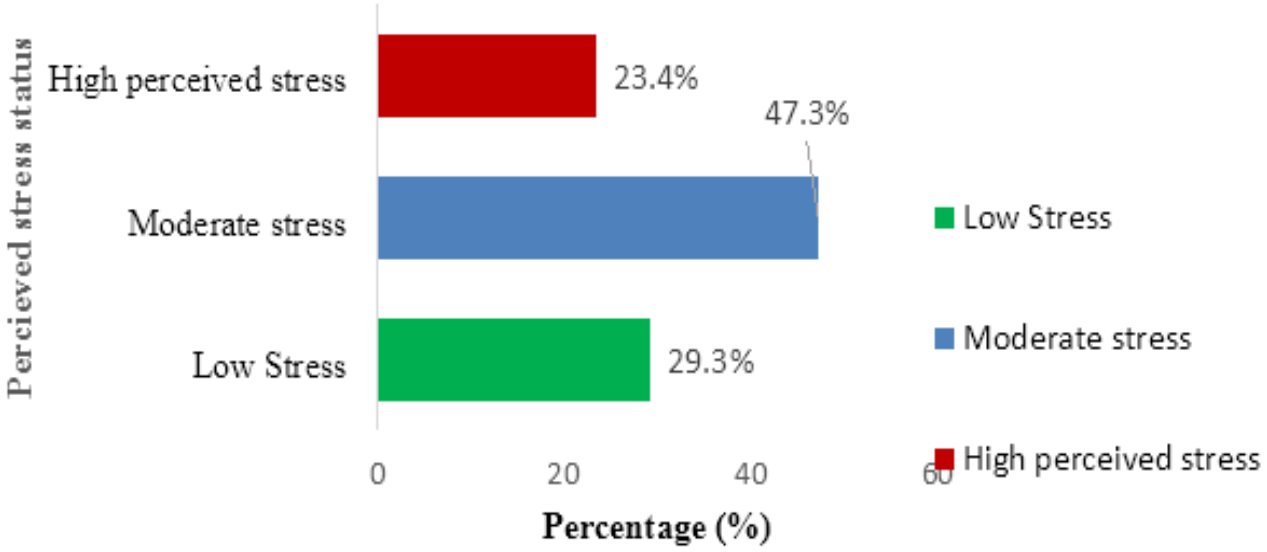

Figure4: Perceived stress status of the study participants who attended the adult OPD Service at Shashemen Comprehensive Specialized Hospital, Ethiopia 2021(n=423)

Discussion

Infection with H. pylori occurs worldwide, while the prevalence varies greatly among countries & population groups within the same country8. Even though the mode of H. pylori transmission remains controversial, studies suggested that it's commonly transmitted by fecal oral route through contaminated water & food, while lack of proper sanitation, basic hygiene, poor diets & overcrowding have been found to play a significant role in H. pylori infection 9. The majority of the infected individuals are asymptomatic; nevertheless, a small percentage tends to develop manifestations of peptic ulcer diseases later in life 10This study indicates the prevalence of H. pylori infection among both dyspepsia and non-dyspeptic adult clients coming to hospital facilities.

In this study, the Wondfo H. pylori feces test kit was used to detect antigen. It is a reliable noninvasive method for detecting H. pylori antigens in stool specimens because active infection can be delineated. This method has also been shown to have high sensitivity and a positive predictive value for the screening of H. pylori infection 17. The magnitude of H. pylori positive among study participants was 26.7% with 95%CI (22.9, 31.2) based on testing H. pylori stool antigens. This study showed H. Pylori infection was significantly associated with educational status, dyspepsia & non-dyspepsia, family Size; types of used food, alcohol use History, low & highly perceived stress.

This finding is comparable with study conducted in Dessie, Ethiopia of 30.4% 18. While prevalence of this study is higher than study conducted in Yirga Cheffe, Southern Ethiopia with 7.7% 19 and it is lower than study a carried out in Assosa 48.7% 13 and meta-analysis that had been done in Ethiopia (52.2%) 12. The possible reason of the differences might be mainly due to different laboratory diagnostic techniques (invasive & non-invasive types). Furthermore, the selection of one or more diagnostic tests will depend on sensitivity and specificity, ability to differentiate recent infection from past, clinical conditions, experience of the technician or clinician, cost & type of specimen needed. Most of the studies conducted in Ethiopia used IgG antibodies, which had a questioning performance to differentiate recent infection from past infections and were found to be falsely positive in client's months after treatment and bacterial eradication. Therefore, the use of serology antibody test may lead to an overestimation of prevalence by including subjects who had been infected but were cured prior to testing. Additionally, the variation might be also due to the study design, disparities in the socio-economic status of the study subjects, sample size, study setting and study population 17.

The current study indicated that low educational level was statistically significant with prevalence of H. pylori

infection. In this association, participants who had no formal educations were 3 times more likely to be affected by H. pylori infection than who had formal education. This could be due to the fact that inadequate education or low education level has a significant impact on personal & environmental hygiene and play a great role in the rise of the prevalence of H. pylori infection. This finding was comparable to previous study conducted in Addis Abeba, Ethiopia, which showed significant association with low educational status and H. pylori infection at AOR 95% 4.15 (1.059–16.270) 20.

However, the current study showed when frequent consumers of alcohol (>once/week) was four (4) times at risk of developing infection & significantly associated with of H. pylori infection. This result is in lined with previously reported study which indicated when large amount of alcohol consumption was positively associated with active H. pylori infection18 The reason for the above contradictory results might be due to difference in types & amounts of consumed alcohol beverages.

In Ethiopia, common local alcoholic drinks are "Tella", "Teji" "Araki" and "beer" which are quite different in alcohol content. The significant association in our study could be explained due to the hypothesis that heavy alcohol drinking facilitates H. pylori infection, while it also increases the mucosa's permeability by damaging the mucosal barrier. Besides the damaged gastric mucosa, bacterial adherence & host factors may also be involved in the synergistic effect of H. pylori infection.

In this study, participants who had manifested dyspepsia were 3.5 times more likely to develop H. pylori infections than non-dyspeptic clients. The causes of dyspepsia are multifactorial but Helicobacter pylori infection is one likely candidate. This cause might be due to the effect of GI symptoms providing a growing medium (changing pH, thinning of gastric wall, gastric ulceration, change in gut microbiota) for the bacteria 12. Additionally, individuals infected with these bacteria clearly results in chronic mucosal inflammation in the stomach & duodenum, which, in turn, might lead to abnormalities in gastroduodenal motility and sensitivity 9.

This figure of clinical sign & symptom is supported by study conducted in Assosa, Ethiopia in which participants complaining dyspepsia was more or 2 times at risk of acquiring H. pylori infection than non-dyspepsia or apparently non-symptomatic adult 13 .Similarly, study done in Yirgachafe, south Ethiopia supported while dyspeptic patients were six times more associated with dyspeptic patients than non-dyspeptic individuals.

In the current study, having high family size per household is significantly associated with H. pylori infection. This might be due to the condition related to crowdedness which favors the transmission of the bacterium between individuals. Similar studies from Mizan Aman Town, Jinka Zone, Southwest Ethiopia 21 & Dessie town, Northern Ethiopia 22 suggested that high crowding index was a significant predictor of H. pylori infection. Furthermore, this result is supported by the study conducted in Harare, Zimbabwe 23, which documented that family size is a predictor variable for the infection and that high family members per household will play a significant role in interfamilial transmission of the bacterium, which results in a high prevalence of H. pylori in the general population.

In this study, participants who consumed uncooked food were more likely to become infected by H. pylori than respondents who used cooked foods. This is supported by a study conducted in Buri, Italy, where those who consumed raw or uncooked food were associated with H. pylori infection and were more likely to be exposed to H. pylori infection23. Likewise, the food prepared under less-than-ideal conditions or exposed to contaminated water or soil may increase the risk of H. pylori infection.

The present study shows highly perceived stress was significantly associated with H. pylori infection, while participants who had low perceived stress were less likely to be infected by H. pylori infections than who perceived to be severely stressed. This might be due to the psychological stress could increase the chances of ulceration in duodenal mucosa that have already been weakened by the effects of H. pylori infection simply by increasing the acid secretion which promote bacteria colonization of duodenal bulb by neutralizing the inhibitory effect of bile 24.

At present beside the lack of sufficient evidence on proving a causal relationship between psychological stress & H. pylori infection which is closely associated with stress in gastric ulcer patients, study in Indonesia suggested that the long-term stress can induce increased & aggravated the intestinal mucosal injury and erosions, while the effect may occur independently of H. pylori infection 25.

Strength of the Study

The study included both apparently healthy or asymptomatic & symptomatic or dyspeptic individuals, which supports relatively the true prevalence of H. pylori infection.

This study tried to incorporate & clue some additionally important risk factors or variables such as stress, NSAIDS, ABO blood types & dietary intakes which were previously assessed by few researchers or suggested by few studies.

Manipulation of H. Pylori stool antigen test method which is relatively good in differentiating the active infection from the past or previously infected patients.

Limitation of the Study

Information about food consumption was based on only type & frequency of usage without detection of units & calories of dietary regimes due to shortage of budget.

Conclusion

The overall H. pylori stool antigen prevalence rate is high as compared to study conducted in Yirga chafe, southern Ethiopia and also indicated when more than one in four clients were being infected, and an intention was also expected to be low or zero among apparently healthy individuals. This prevalence was significantly associated with educational status, clinical sign and

symptoms (dyspepsia & non-dyspepsia), family Size, types of used food, alcohol use history, perceived stress. However, no significant association was observed between other sociodemographic variables, lifestyle factors and H. pylori stool antigen detection. Finally, the previous intention of H. pylori to be found & affect apparently healthy (asymptomatic) individuals was negligible & attention was not given to be assessed properly. So, this study shows promising result for further investigation by upcoming researchers.

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