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RAPID COMMUNICATION

Seroprevalence of *Helicobacter pylori* in dyspeptic patients and its relationship with HIV infection, ABO blood groups and life style in a university hospital, Northwest Ethiopia

Feleke Moges, Afework Kassu, Getahun Mengistu, Solomon Adugna, Berhanu Andualem, Takeshi Nishikawa, Fusao Ota

Feleke Moges, Afework Kassu, Department of Microbiology and Parasitology, Gondar College of Medicine and Health Sciences, University of Gondar, Ethiopia
Getahun Mengistu, Department of Internal Medicine, Faculty of Medicine, Addis Ababa University, Ethiopia
Solomon Adugna, Department of Biochemistry, Gondar College of Medicine and Health Sciences, University of Gondar, Ethiopia
Berhanu Andualem, Department of Biology, Faculty of Applied Science, University of Gondar, Ethiopia
Takeshi Nishikawa, Hokkaido University of Education, Sapporo Campus, Division of Medicine and Nursing, Japan
Afework Kassu, Fusao Ota, Department of Preventive Environment and Nutrition, Institute of Health Biosciences, The University of Tokushima, Japan
Supported by University of Gondar
Correspondence to: Feleke Moges, Department of Microbiology and Parasitology, Gondar College of Medicine and Health Sciences, University of Gondar, PO Box 196, Gondar, Ethiopia. felekemogesy@yahoo.com
Telephone: +251-8-110174-250 Fax: +251-8-111479
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Abstract

AIM: To determine the prevalence of *Helicobacter pylori* (*H pylori*) among dyspeptic patients and to assess the relationship between *H pylori* infection, blood group, HIV infection and life style of the patients.

METHODS: In a hospital-based cross-sectional study, patients attending Outpatient Department of University of Gondar Hospital were enrolled. Socio-demographic information was collected using questionnaires. Serum was analyzed for anti-*H pylori* IgG antibodies using a commercial kit. HIV serostatus was determined by enzyme-linked immunosorbent assay (ELISA). Blood grouping was performed by slide agglutination tests.

RESULTS: A total of 215 dyspeptic patients were included in the study. One hundred and sixteen patients (54%) were females and 99 (46%) were males. Anti-*H pylori* IgG antibodies were detected in sera of 184 (85.6%) patients. The prevalence was significantly higher in patients aged 50 years and above. Twenty point five percent of the patients were found to be seropositive for HIV. No significant association was found between sex, ABO blood groups, consumption of spicy diets, socio-economic status and seropositivity for *H pylori*. However, alcohol consumption was significantly associated with *H pylori* serology.

CONCLUSION: The prevalence of *H pylori* infection is associated with a history of alcohol intake and older age. The effect of different diet, alcohol and socioeconomic status as risk factors for *H pylori* infection needs further study.

Key words: *H pylori*; Blood group; HIV; Life style

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INTRODUCTION

Helicobacter pylori (*H pylori*), a flagellate Gram negative rod, infects over half of the world's population[1] and plays a pivotal role in the etiology of a number of gastroduodenal diseases and development of gastric malignancy[2-4]. *H pylori* has been recognized as grade one carcinogen[5] and the National Institute of Health Consensus Development Conference Statement recommended that all patients who are found to have gastric or duodenal ulceration and concurrent *H pylori* infection should receive treatment aimed at eradicating the bacterium[6].

Low socio-economic status, low level of education, consumption of alcohol, gender and occupation are the risk factors for *H pylori* infection[7]. In addition, blood group antigens, which mediate attachment of *H pylori* to gastric mucosa, are associated with a risk of developing peptic ulcer and gastric cancer[1]. About 95% of patients with duodenal ulcers and perhaps 80% of patients with peptic ulcers are infected with this bacterium and its eradication greatly diminishes the recurrence of these ulcers[8]. However, there have been very few studies on the prevalence of *H pylori* in Ethiopian patients[9,10]. Therefore,

Table 1 Association between socio-demographic characteristics and seropositivity for antibodies against H. pylori infection in dyspeptic patients (Northwest Ethiopia, 2003)

Characteristics	*n*	Serum anti-HP+ [*n* (%)]	Serum anti-HP- [*n* (%)]	OR (95% CI)	*P* value
Sex					0.2
Male	99	88 (88.9)	11 (11.1)	1	
Female	116	96 (82.8)	20 (17.2)	0.6 (0.272,1.32)	
Age group (yr)					0.2
<20	22	18 (81.8)	4 (18.2)	1	
20-29	62	51 (82.3)	11 (17.7)	1.03 (0.29, 3.65)	
30-39	58	47 (81.0)	11 (19.0)	0.95 (0.27, 3.37)	
40-49	32	27 (84.4)	5 (15.6)	1.20 (0.28, 5.08)	
50-59	27	27 (100.0)	0 (0.0)	2205.4 (0.0, 4.7E+19)	
60-69	10	10 (100.0)	0 (0.0)	2205.4 (0.0, 1.5E+3)	
70-79	4	4 (100.0)	0 (0.0)	2205.4 (0.0, 5.6E+45)	
Occupation					0.69
Farmer	114	97 (85.1)	17 (14.9)	1	
House wife	14	12 (85.7)	2 (14.3)	1.05 (0.22,5.12)	
Govt employee	20	18 (90)	2 (10.0)	1.57 (0.34, 7.43)	
Student	29	24 (82.8)	5 (17.2)	0.84 (0.28, 2.51)	
Unemployed	14	14 (100.0)	0 (0.0)	639.67 (0.0, 3.6E+39)	
Merchant	6	5 (83.3)	1 (16.7)	0.87 (0.09, 7.97)	
Soldier	2	2 (100.0)	0 (0.0)	639.67 (0.0, 1.5E+39)	
Others	16	12 (75.0)	4 (25.0)	0.52 (0.15, 1.82)	
Address					
Rural	127	109 (85.8)	18 (14.2)	1	
Urban	88	75 (85.2)	13 (14.8)	0.95 (0.44, 2.06)	
Marital status					0.7
Married	135	117 (86.7)	13	1	
Widowed	13	11 (84.6)	2 (15.4)	0.85 (0.17, 4.13)	
Divorced	22	18 (81.8)	4 (18.2)	0.69 (0.21, 2.28)	
Single	39	32 (82.1)	7 (17.9)	0.70 (0.27, 1.83)	
Underage	6	6(100.0)	0(0.0)	206.42 (0.0, 1.1E+15)	

HP+= Helicobacter pylori positive ; *HP- = Helicobacter pylori* negative.

the aim of this study was to determine the prevalence of *H pylori* among dyspeptic patients and to assess the relationship between *H pylori* infection, blood group, HIV infection and life style of patients attending Gondar University Hospital in Northwest Ethiopia.

MATERIALS AND METHODS

The study was conducted at the Hospital of Gondar University, Northwest Ethiopia, from February 2003 to June 2003. Patients who presented with complaints of dyspepsia were included in the study. Institutional ethical clearance was obtained from the Research and Publication Committee of Gondar University.

Socio-demographic and relevant clinical information was collected by a questionnaire. A senior internist examined the patients and filled the questionnaires. The variables included sex, age, ethnicity, smoking, stress, nutrition, alcohol consumption, exercise and socio-economic factors. After informed consent was obtained from each patient and appropriate pre-test counseling was provided about 5mL of venous blood was collected in vacutainer tubes and sera were separated by centrifugation immediately after clotting. Serological status of *H pylori* infection was tested with commercial *H pylori* serology kits (HEXAGON H.PYLORI, Germany) following instructions of the manufacturer. The kit was used for the detection of *H pylori* IgG antibodies in serum. It could detect anti-*H pylori* antibodies with a highsensitivity (97%) and specificity (95%) when compared with ELISA (HEXAGON H.PYLORI, Germany). Blood grouping was performed by slide agglutination test using monoclonal anti-A, anti-B, anti-AB and anti-D (Rho) antibodies. Testing for the presence of HIV antibodies was determined by ELISA following the manufacturer's instructions (Vironostica HIV Uni-Form II plus O, Organon Teknika, Boxtel, The Netherlands). HIV serology test was carried out anonymously with all clinical and laboratory data identified by a code number. Data entry and analysis were performed using SPSS version 10 statistical package. χ^2 test was used to compare the categorical data and logistics regression was used to avoid the confounder effect and to calculate the risk ratio. Odds ratio (OR) and 95% confidence interval (CI) were used to measure the strength of association. $P<0.05$ was considered statistically significant.

RESULTS

A total of 215 dyspeptic patients were included in the study. Table 1 shows the socio-demographic characteristics of the study population in relation with *H pylori* serostatus. The mean age of the subjects was 35 years (range 14-74 years). A substantial majority (55.8%) of the patients were young adults aged 20-40 years. Females constituted 54% of the patients. Fifty three percent of the patients were farmers followed by students (13.5%). Regarding the marital status, 62.8% were married, 18.1% were singles and 10.2% were divorced. Fifty nine point one percent of the

Table 2 *H pylori* and HIV co-infection in dyspeptic patients attending Gondar University Hospital (Northwest Ethiopia, 2003)

	H pylori		Total	Statistics
	Seropositive *n* (%)	Seronegative *n* (%)	*n* (%)	
HIV seropositive	36 (19.6)	8 (25.8)	44 (20.5)	$P=0.4$
HIV seronegative	148 (80.4)	23 (74.2)	171 (79.5)	$\chi^2=0.63$

Table 3 Demographic factors for HIV infection in dyspeptic patients attending Gondar University Hospital (Northwest Ethiopia, 2003)

Characteristics	HIV serostatus		*P*
	Seropositive *n* (%)	Seronegative *n* (%)	
Male	19 (19.2)	80 (80.8)	$P=0.6$
Sex			OR= 0.87 (95% CI 0.42-1.77)
Female	25 (21.6)	91 (78.4)	$\chi^2=0.18$
Age group (yr)			
10-29	21 (25.3)	62 (74.7)	$P=0.3$
30-49	17 (18.7)	74 (81.3)	$\chi^2=2.23$
⩾ 50	6 (14.6)	35 (85.4)	$\gamma=2$
Residence			$P<0.01$
Rural	19 (15.0)	108 (85.0)	OR=0.45 (95% CI 0.21-0.92)
Urban	25 (28.4)	63 (71.6)	$\chi^2=5.78$
Occupation			
Farmer	18 (15.8)	96 (84.2)	$P<0.001$
Housewife	3 (21.4)	11 (78.6)	$\chi^2=24.78$
Gov't employee	2 (10.0)	18 (90.0)	$\gamma=7$
Students	4 (13.8)	25 (86.2)	
Unemployed	8 (57.1)	6 (42.9)	
Merchant	4 (66.7)	2 (33.3)	
Soldier	0	2 (100)	
Others	5 (31.3)	11 (68.7)	

patients came from Gondar town and the remaining 48.1% came from rural areas.

Among the patients, 184 (85.6%) were found to be positive for anti-*H pylori* antibodies. The sex specific prevalence in males was 88.9% which was not significantly different from that of females (82.8%). The prevalence of *H pylori* was significantly higher in patients aged 50 years and above (100%) when compared to patients aged < 50 years (82.2%) ($\chi^2=8.54$, $\gamma=1$, $P<0.05$). *H pylori* seroprevalence was not associated with residence, marital status, occupation and ethnic group of the patients ($P>0.05$) (Table 1).

The prevalence of HIV among the patients was about 20.5% (44/215). The HIV seropositivity was not associated with *H pylori* seropositivity as only 19.6% (36/184) of the patients who were positive for *H pylori* were also positive for HIV while 25.8% (8/31) patients who were negative for *H pylori* were positive for HIV (Table 2). Analysis of demographic factors for HIV infection showed a significant association by residence ($\chi^2=5.78$, $P<0.01$) and occupation ($\chi^2=24.78$, $\gamma=7$, $P<0.001$) of the dyspeptic patients (Table 3)

Analysis of blood group showed that 201 (93.5%) of the total subjects were rhesus positive (Rh+) and 14 (6.5%) were rhesus negative (Rh-). Among the total subjects blood group O was the most common blood group (43.3%) in the patients followed by blood groups B (28.4%), A (22.3%) and AB (6.0%), respectively. However, no statistically significant association was seen between *H pylori* infection and blood group of the patients (Table 4).

Table 4 Relationship between ABO blood groups and seropositivity of antibodies against *Helicobacter pylori* infection

Blood group	Serum anti HP+ [*n* (%)]	Serum anti HP- [*n* (%)]
O	76 (84.4)	14 (15.6)
B	59 (88.1)	8 (11.9)
A	41 (85.4)	7 (14.6)
AB	8 (80)	2 (20)
Total	184 (85.6)	31 (14.4)

Table 5 Relationship between *Helicobacter pylori* infection and life style in dyspeptic patients attending Gondar University Hospital (Northwest Ethiopia, 2003)

		Serum anti-HP+ *n* (%)	Serum anti-HP- *n* (%)	*P* value
Alcohol intake	Yes	128 (90.1)	14 (9.9)	<0.01
	No	56 (76.7)	17 (23.3)	$\chi^2=7.05$
Diets	Coffee	24 (82.8)	5 (17.2)	$\gamma=1$
	Spicy food	108 (89.3)	13 (10.7)	=0.2
	Others	52 (80)	13 (20)	$\chi^2=3.15$
				$\gamma=2$

History of diet, alcohol consumption and socio-economic status were obtained from the patients. It was observed that seropositivity for anti-*H pylori* antibodies was significantly associated with history of alcohol consumption (OR=2.78, 95% CI: 1.19-6.5, $P<0.01$) (Table 5). Although there was a higher prevalence of *H pylori* infection in those with low socioeconomic status than in those having average income, the association was not statistically significant. Likewise, no statistically significant interaction was observed in the prevalence of *H pylori* infection and consumption of coffee and spicy foods (Table 5).

DISCUSSION

The prevalence of *H pylori* IgG antibody among dyspeptic patients was 85.6%. This finding is higher than an earlier report from 136 patients with non ulcer dyspepsia from Addis Ababa, showing a prevalence of 65% for *H pylori*[9]. However it is comparable with a recent report from blood donors in Addis Ababa, where a seroprevalence of 89% has been observed[10]. When compared to studies from other countries like England, France, Scandinavia, Italy, Belgium and USA, the seroprevalence found in this study is much higher[11]. This may be explained by the association between *H pylori* and low socioeconomic status as evidenced by unsafe drinking water[12] and other factors like low educational level which would have an impact on personal hygiene and environmental sanitation[13].

Prevalence of *H pylori* increases with age. It is interesting to note that in patients aged 50 years and above its prevalence is 100%. Similar results have been reported in

other studies indicating the high frequency of infection in the elderly[13]. This tendency is believed to be attributable to the environmental factors specific to these age group rather than aging[13]. The lack of significant association between sex, residence of patients and *H pylori* is in line with previous reports from elsewhere[14,15].

In the present study, more than one fifth of the patients (20.5%) were found to be seropositive for HIV and the seroprevalence of HIV in *H pylori*-infected patients was also very high (19.6%). This high prevalence of HIV in dyspeptic patients reflects the severe magnitude of HIV infection in the general population in Northwest Ethiopia. Recent studies showed that 51.4% tuberculosis patients[16] and 5% cataract patients[17] were seropositive for HIV in the region substantiating our present observation. Co-infection with HIV can debilitate the defense mechanism of patients and increase morbidity and mortality.

Blood group O is associated with duodenal ulcer disease, while gastric ulcer and gastric carcinoma are associated with blood group A[18]. Since the identification of *H pylori*, no pathogenic mechanism has been identified to support this earlier finding. Lewis B blood group antigen has recently been shown to function as a receptor for *H pylori* adhesins, mediating bacterial adherence to the gastric epithelial surface, which is essential for bacterial colonization[19]. Furthermore, substitution of the Lewis B antigen with blood group A and B determinants results in failure of *H pylori* binding[19]. Reduced exposure of the Lewis B epitope in persons of blood groups A and B could result in lower *H pylori* infection rates and a predominance of *H pylori* infection in persons of blood group O[20]. This is consistent with the reported association of blood group O with duodenal ulcer disease, but at variance with the association of blood group A with gastric ulcer and carcinoma, which is also related with *H pylori* infection. The present study did not demonstrate any significant difference in *H pylori* serological status of dyspeptic patients with varying blood groups, which is consistent with similar studies from other countries[18,20-22].

Histories of alcohol (local alcoholic drinks like "Tella", "Teji" "Araki" and beer) consumption appears to be a risk factor for *H pylori* infection, which is in line with study from Finland[23]. However, different results have been reported in other countries[24]. The reason for this contradictory result might be due to the difference in the type of alcoholic beverages consumed and the life time history of alcohol consumption. Socioeconomic status does not appear to be a risk factor for *H pylori* infection, although a higher proportion of patients with low income are found to be positive for *H pylori* antibody. This result is in line with reports form Zambia and United Kingdom[25,26]. Spicy foods and coffee are considered to be risk factors for *H pylori* infection. However, no statistically significant interaction was observed in the present study, but it has been reported in Japan[27].

In conclusion, the prevalence of *H pylori* infection is very high and associated with history of alcohol intake and older age. Different diet, alcohol and socioeconomic status as risk factors for *H pylori* infection need further study.

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