Helicobacter pylori infection according to ABO blood group among blood donors in Kosovo

Bukurije Zhubi[1]*, Zana Baruti-Gafurri[2], Ymer Mekaj[1], Mimoza Zhubi[1], Idriz Merovci[1], Iliriane Bunjaku[3], Valdete Topciu[2], Emine Devoli-Disha[2]

[1] National Blood Transfusion Centre of Kosovo, Pristine (NBTCK), Mother Theresa st., 10000, Pristine, Republic of Kosovo. [2] Diagnostic Center, University Clinical Center Kosovo, Mother Theresa st., 10000 Prishtina, Republic of Kosovo. [3] Clinic of Lung Disease, University Clinical Center Pristine, Kosovo, Mother Theresa st., 10000, Pristine, Republic of Kosovo

Abstract

Introduction: Numerous studies have reported a high prevalence of *Helicobacter pylori* infection among healthy and non-healthy persons in different places. The Aim of the study is to investigate the seroprevalence of *H. pylori* infection among Kosovo's Blood donor associated with ABO/Rhesus blood group.

Methods: 671 blood donors are tested for *H. pylori* antibodies and results are classified by way of donation, age, gender, blood groups and education level. Serum antibodies are analyzed by Enzyme Linked Fluorescent Assay test for *H. pylori* IgG with Biomerieux HPY-VIDAS.

Results: The frequency of IgG antibody for *H. pylori* among healthy blood donors is 56.9%, there is not found any difference between voluntary and non-voluntary blood donors (57.4% respectively 56.3%)(OR=1.05; 95% CI 0.76 to 1.43; p=0.8). H pylori IgG antibodies positive are detected in 57.0 % (126 of 221) of women, compared with 56.9 % (256 of 450) of men(OR=0.99; 95% CI 0.72 to 1.38; p=0.96). Serpositive donors are older than seronegative ones (31.9 years, respectively 29.5 years, p=0.02). Mean value of IgG antibody of *H. pylori* is 3.61 with no significant difference between males and females (3.72 respectively 3.44; p=0.2). The seroprevalence of *H. pylori* infection is similar among blood groups: O (57.4%), A (56.2%), B (59.6%), AB (51.4%), RhD positive (56.7%) and RhD negative (58.3%).

Conclusions: The seropositivity of *H. pylori* is moderately higher in the non voluntary and familiar blood donors among the total Kosovo blood donors. There is not found a significant relationship between infection with *H. pylori* and ABO/Rhesus blood group among blood donors.

Keywords: H. pylori infection, blood donors, blood group

Introduction

Numerous studies have reported a high prevalence of *H. pylori* infection among healthy (1, 2, 3) and non healthy (4, 5, 6) persons in different places (7). *H. pylori* infection is recognized as the major cause of chronic gastritis (8), and a factor in the pathogenesis of peptic ulcer disease (9), gastric adenocarcinoma (10) and the gastric non-Hodkin lymphoma of mucosa-associated lymphoid tissue (MALT) (11). *H. pylori* infect more than half of the population in the world (10), but there are large differences in the prevalence of infection among ethnic groups (12, 13). Infection occurs early (12) and *H. pylori* seropositivity increased with age (14, 15). Lower socioeconomic status (crowded living conditions) is associated with high infection rates (4, 15). The prevalence of *H. pylori* in rural communities is higher than in urban population (10). Transmission is by the oral-oral route, but some data reports for fecal-oral transmission route (16). *H. pylori* infection may, in some instances, be a zoonosis (6). Once *H. pylori* infection is acquired, it persists for decades and probably for life in untreated persons (13).The high prevalence of *H. pylori* infection 70%-90% is found among persons in developing countries (9, 13) but, about 20% of *H. pylori* infected people develop clinically apparent conditions such as peptic ulcers or neoplasia. Education level was associated with negative *H. pylori* status (17). Based in above mentioned studies of many authors, *H. pylori* infection represents a highlighted

* Corresponding author: Bukurije Zhubi, National Blood Transfusion Centre of Kosovo, Pristine (NBTCK), Mother Theresa st., 10000, Pristine, Republic of Kosovo; Phone+37744169583
Fax: +38138552720; E-mail: bzhubi@yahoo.com

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problem in the healthy population of many countries. Because in Kosovo there are no studies in this area, the aim of this paper is the investigation of frequency of *H. pylori* infection in blood donors according to the type of blood donation (volunteers and familiarly), gender, age, education level and blood groups. Also it is evaluate mean value of IgG Antibody to *H. pylori* according to age group, gender and blood group among blood donors.

Methods

In this study are evaluated 671 blood donors who underwent ABO/Rhesus blood typing and measurement of serum anti *H. pylori* IgG antibodies. Stored blood donor sera (450 males, mean age of 32.23 and range 18 to 65 years; 221 females, mean age of 28.18 and range 18 to 65 years; p is 0.0001) are collected from the March to April 2009 in Kosovo's Blood Transfusion Center. Age, gender, social class, educational level and ABO/RhD blood groups and IgG values are recorded. All donors are divided in two groups: voluntary donors and non voluntary or familial donors who gave blood for their relatives. Blood donors are categorized into three groups according to the educational level: group I with primary education level, group II with secondary and group III with high educational level. Also, they are divided according to age (group I: 18-19 years, n=164; group II: 20-29 years, n=216; group III: 30-39 years, n=108, group IV: 40-49 years, n=110; group V: 50-59 years, n=61, and group VI: 60-65 years, n=12. Beforehand, blood donors are screened and anyone taking anti-inflammatory drugs, antibiotics, or corticosteroids or who is found to have any problem with health is not allowed to donate blood. Serum antibodies are tested against *H. pylori* infection by blood groups, age, and gander, which are later analyzed by ELFA (Enzyme Linked Fluorescent Assay) test for *H. pylori* IgG with Biomerieux HPY-VIDAS. The non-invasive serological method is used for determining presence of *H. pylori* IgG antibody in serum. Ten millilitres of blood sample is taken from each donor and the sera stored at -20° C until required. The assay principle combines a 2 step enzyme immunoassay sandwich method with a final fluorescent detection (ELFA). The commercial kit for detecting anti-*H. pylori* antibody is found to have a sensitivity of 98.10% (Confidence interval 93.12%-99.77%) and a specificity of 90.82 % (Confidence interval 93.12%-99.77%). Interpretation of the test result is done as follows: the result lower than 0.75 is interpreted as negative, the result between 0.75- <1.00 is interpreted equivocal, and the values higher than >1.00 is interpreted as positive. In this study it is found that 48 samples of blood donors were equivocal to *H. pylori* antibody, therefore they are excluded and not evaluated. Also it is evaluated mean value of Ig G Antibody to *H. pylori* according to age group, gender and Blood group. Blood grouping is performed by slide agglutination test using monoclonal anti-A, anti-B, anti-AB and anti-D (Rho) antibodies. Statistics. For the parametric variables, values are expressed as mean ± DS. Comparison of means between groups is tested using a Student t-test. For all statistical tests conducted, the alpha level was set at 0.05. ANOVA-test is used for the analysis of mean differences of IgG *H. pylori* between blood group ABO and age-groups. A Chi-square test is used for the analysis of distribution of *H. pylori* infection donors according to the blood groups. Statistical analysis is performed using INSTAT 2 statistical software system.

Results

From the total number of 671 tested blood donors for *H. pylori* infection, 382 or 56.9%, required IgG antibody for *H. pylori*, but there is not found difference between voluntary (57.4 %), and non voluntary blood donors (56.3%) (OR=1.05, 95% CI 0.76 to 1.43, and p value 0.8) (Table 1). Serpositive donors are older 31.9 years, compared with seronegative ones 29.5 years, p is 0.02 (Table 2). The rate of *H. pylori* infection is not significantly different in male and female with anti H pylori Ig G antibodies detected in 57.0% (126 of 221) of women compared with 56.9% (256 of 450) of men (OR=0.99; 95% CI 0.72 to 1.38; p=0.96) (Table 3).

TABLE 1. Frequency of *H. pylori* infection among voluntary and non voluntary (familiar) blood donors

Tested blood donors for anti IgG *H. pylori*, no. (%)	Voluntary (n=408)	Non-voluntary Familiar) (n=263)	Total (n=671)
H. pylori positive	234 (57.4)	148 (56.3)	382 (56.9)
H. pylori negative	174 (42.7)	115 (43.7)	289 (43.1)

OR=1.05 (95% CI 0.76 to 1.43, p=0.8)

TABLE 2. Characteristics of blood donors according to age and infection with *H. pylori*

Characteristic	*H. pylori* Positive donor (n=382)	*H. pylori* Negative donor (n=289)
Mean age±SD *	31.9±12.9	29.5±12.3
Median	28.0	24.0
Range	18.0-65.0	18.0-65.0

*T-test=2.4, df=669, p=0.02

TABLE 3. Frequency of *H. pylori* infection among blood donors according to gender

Tested blood donors for anti IgG *H pylori*, no. (%)	Males (n=450)	Females (n=221)
H. pylori positive	256 (56.9)	126 (57.0)
H. pylori negative	194 (43.1)	95 (43.0)

OR=0.99 (95% CI 0.72 to 1.38, p=0.96)

Mean value of Ig G Ab of *H. pylori* is 3.6, range 1.13-11.4 and median value 3.13. There is not found significant difference between male and female mean value (3.7 respectively 3.4, p is 0.2), (Table 4). According to age it is found a high frequency of *H. pylori* infection among blood donors in all age group: 18-19 years (51.8%), 20-29 years (53.7%), 30-39 years (62%), 40-49 years (60.9%), 50-59 years (65.6%) and age group 60-65 (70%) (Figure 1). Mean value of Ig G Antibody to *H. pylori* according to age group is higher in age group 50-59 year (3.92, range 1.2-10.2 and median value 3.57). No significance among mean value of all age groups are found, p is 0.89), (Table 5). Blood donors with secondary level education have lower levels of infection (56.4%) compared with subjects with primary and higher education (57.2% respectively 57.8%), but with no significance between all groups p=0.95 (Figure 2). In table 6 it is represented the similar frequency of *H. pylori* infection among blood groups: O (57.4%), A (56.2%), B (59.6%) and AB (51.4%) with p value 0.9. The similar rate of *H. pylori* infection is found among Rh D positive donors 56.7 %(333) and Rh D negative donors 58.3% (49 blood donors) with p value 0.8. There are not found variation among seropositive *H. pylori* mean value between group O, A, B or AB (3.67, 3.52, 3.99 respectively 3.53),

TABLE 4. Value of IgG Antibody of *H. pylori* among blood donors according to gender

Characteristic	Total (n=382)	Male (n=256)	Female (n=126)
Mean value IgG Ab±SD *	3.6±2.1	3.7±2.1	3.4±2.2
Median	3.1	3.4	2.6
Range	1.1-11.4	1.1-11.3	1.1-11.4

*T-test (M vs. F) = 1.2, df=380, p=0.2

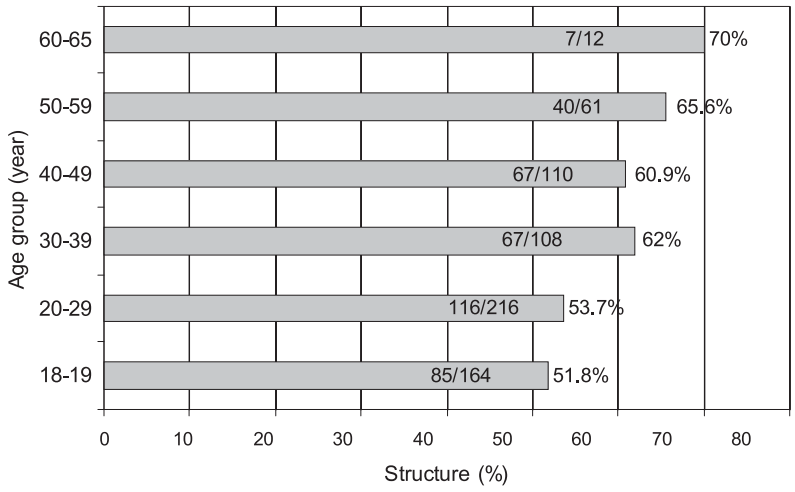

FIGURE 1. Frequency of IgG antibody to *H pylori* among blood donors according to age group

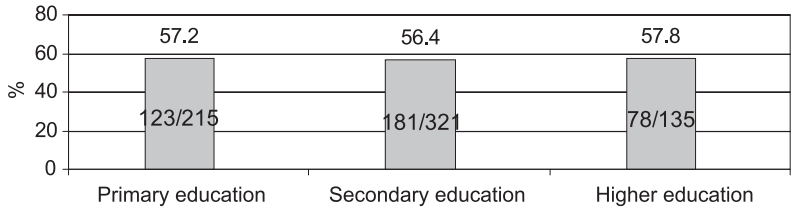

FIGURE 2. IgG seroprevalence of H pylori in 671 blood donors according to education level.

TABLE 5. Mean values of IgG Ab of *H. pylori* positive according to age group in Kosovo's blood donors

Variables	Age group					
	18-19 (n=85)	20-29 (n=116)	30-39 (n=67)	40-49 (n=67)	50-59 (n=40)	60-65 (n=7)
Mean±SD (*)	3.7 ± 2.4	3.5 ± 2.0	3.5 ± 2.0	3.7 ± 2.3	3.9 ± 2.4	3.2 ± 2.1
Median	2.9	3.2	3.2	3.4	3.6	2.2
Range	1.2-11.7	1.1-11.4	1.1-9.1	1.2-11.1	1.2-10.2	1.2-10.8

(*) ANOVA-Age group: F=0.3, p=0.89

TABLE 6. Frequency of *H. pylori* infection among blood donors according to ABO blood group and Rh D Antigen

Tested blood donors for anti IgG *H pylori*, no. (%)	Blood Group					
	O (n=298)	A (n=249)	B (n=89)	AB (n=35)	RhD (poz) (n=587)	RhD (neg) (n=84)
H. pylori positive	171 (57.4)	140 (56.2)	53 (59.6)	18 (51.4)	333 (56.7)	49 (58.3)
H. pylori negative	127 (42.6)	109 (43.8)	36 (40.4)	17 (48.6)	254 (43.3)	35 (41.7)

ABO Groups: Chi-test = 0.8, p = 0.9
RhD Groups: Chi-test = 0.08, p = 0.8

TABLE 7. Mean values of IgG Ab of *H. pylori* positive in relation to ABO blood group and Rh D Antigen in Kosovo's blood donors

Variables	Blood Group					
	O (n=171)	A (n=140)	B (n=53)	AB (n=18)	RhD (poz) (n=333)	RhD (neg) (n=49)
Structure (%)	44.8	36.6	13.9	4.7	87.2	12.8
Mean±SD (*)	3.7 ± 2.0	3.5 ± 2.3	4.0 ± 2.2	3.5 ± 2.1	2.1 ± 3.6	2.7 ± 4.0
Median	3.5	2.7	3.8	3.2	3.2	3.3
Range	1.1-11.4	1.1-11.3	1.2–10.8	1.2-7.8	1.1-11.3	1.1-11.4

(*)ANOVA – ABO Group: F = 0.8, p = 0.5
ANOVA – RhD Group: F = 1.2, p = 0.3

p is 0.5. Also, it is not found a significant difference between mean value of Ig G Ab of *H. pylori* in Rh D Positive donors compare with Rh D negative ones (2.05 respectively 2.69) p is 0.3 (Table 7).

Discussion

H. pylori infection has a relevant clinical importance and the testing for *H. pylori* Antibody helps in early detection of "silent" peptic ulcer (18). Previous studies reported a high frequency of *H. pylori* infection among voluntary blood donation (3). Akira et al found high seroprevalence of *H. pylori* infection in blood donors in four prefectures in Japan (19). Also Bernstein et al found in Canadian Indian population high prevalence of *H. pylori* infection (20). The prevalence of *H. pylori* infection continues to be higher in developing countries (17, 21). Also there are found the significant associations between *H. pylori* infection age, ethnicity, and socio cultural behaviours (13). Results reported by Sitas et al (22), presented that acquisition of *H. pylori* infection is related to childhood living conditions (7, 23). The prevalence of infection was higher in the older age group than in younger age group, also low education standard was associated with the prevalence of infection (24). Based in above mentioned data and the unmet need for such a study in Kosovo we gave the idea to analyze our blood donors to *H. pylori* infection in this healthy group of population. In Kosovo voluntary blood donation is still insufficient to cover all patients who need transfusion treatment with blood products, so some donors used to be as familial donors which gave blood for their cousin

(familial). The topic of this study is to compare the frequency of *H. pylori* infection between these two groups of blood donors according to ABO group, Rh factor, gender, age and education level. The overall seroprevalence to *H. pylori* is 56.9% in healthy Kosovo's blood donors with no difference between voluntary and familial donors. This is a moderately high rate of *H. pylori* infection among healthy population. The data from previous studies presented large variations of *H. pylori* infection among blood donors in different countries, but also and in different regions in the same place. Previous studies done in Italy showed a different prevalence to *H. pylori* infection among blood donors in different regions: in Bologna it was 42%, in Sardinia it was 43% and in Torino 47% (18, 6, 25). Some data showed lower prevalence to *H. pylori* infection compared with our data which were: In Italy it was 45% (3), Germany 36.9% (26), Netherlands 35.5% (8), Australia 32% (14), Finland 25% (27), in Sweden was 18.2% (28), in Malaysia 14.2% (29). The similar data with ours are presented by other studies, for example: among Spanish blood donors it was 52.2% (30), blood donors in Guadeloupe 55.2% (2), and in Chinas blood donors 54.9% (31). The higher seroprevalence of *H. pylori* infection up to 60% is found in Brazil and Lebanon (68.2%, respectively 68.3%) (9, 32). Our data showed that the seropositive donors were older than 31.9 years, compared with seronegative ones 29.5 years. Similar data are presented and in Iran (33), when seropositive individuals are older than seronegative ones (24.5 years respectively 23.3 years). Analyzed blood donors by gender showed no difference among men and women (57.89% respectively 57.01%) of *H. pylori* infection. No sex difference to *H. pylori* infection is reported either by other authors (31). Also, no sex difference (17), is reported by EUROGAST study group which investigates asymptomatic subjects in 17 populations (24). But, the data offered by Robertson et al (14), showed a lower frequency for seropositive men and women blood donors (35%, respectively 28%). The similar data with a lower frequency (16.8% in men and 13.6% in female) with no sex difference are found also, in Malaysian blood donors (male 16.8% and female 13.6%) (29), and in the Swedish blood donors (male 19% and female 16%) (28). Other data (33) referred the positivity rate of *H. pylori* which is similar among men (57.6%) and women (50%). But data showed by Russo et al (3) presented higher seoprevalence in men (46.4%) than in women (38.4%). Turkish women are more prone to *H. pylori* infection than man (60.8% respectively 42.9%) (34). In this study it is found that about 52% of the healthy blood donors have acquired *H. pylori* infection by the age 18-19 years. Further more, 54% and 62% of the blood donors are seropositive to *H. pylori* by the 20-29 and 30-39 age group. Blood donors at age 40-65 years developed 55.6% Anti IgG *H. pylori* antibody. This data showed that we have increase of *H. pylori* infection with age, 18 to 59 years and then decrease after 60 years. The data from previous study have shown a steady rise of *H. pylori* carrier rate from under 20 years to 40 years age (31). Also, the study by Ponzetto et al (25), in Italian blood donor confirms that the seroprevalence was higher in older than in younger blood donors. Another study done in blood donors in Bologna in Italy by Vaira et al (18) found increase of *H. pylori* infection with age. The study done in the chronic urticaria patients and Finish blood donors presented the similar data that *H. pylori* infections rise with age (27). In Swedish blood donors is showed increase of *H. pylori* infection till to 39 year, but also and decrease among age 40 to 65 years (28). But the data from other authors suggested significant increase of *H. pylori* infection with age from 36.1% at 18-19 years to 63.7% at 50-59 years (2). Our data are similar with data from Russo et al (3), which found a high frequency to *H. pylori* (67%) in donors aged greater than 50 years. But, there are some data from previous study, which did not match with ours. The prevalence of *H. pylori* infection among asymptomatic healthy blood donors in Northern Peninsular Malaysia did not increase with age (29). It is discussed that social class and education level associated with *H. pylori* infection (22, 24). In the contrast to the data of Sitas et al the data of Vaira D et al (18) suggested no correlation with social class in blood donors in Bologna. An inverse association with seoprevalence was found for different educational levels in investigated subjects in Ontario in Canada (15), and in non- complier

subjects in Brazil (12). Our data represented lower *H. pylori* infection among Blood donors with secondary level education (56.4%), compared with previous studies which have shown lower level (34.1%) of infection in subjects with higher education (24), and the high prevalence of *H. pylori* infection in donors with a low educational level (3). *H. pylori* infection distribution was similar among ABO blood groups and Rhesus factor in Kosovo's healthy blood donors. More studies have revealed no association between the ABO blood groups and *H. pylori* serological status either in healthy (29, 30) or in symptomatic subjects (14, 33, 20, 35). However some data (4, 8) showed a higher seropositivity to *H. pylori* in Rh D negative blood donors and in patients with gastrointestinal complaints (76.3%, respectively 84.5%) compared with our data (56.7%). In contrast to previous mentioned data and our data, Kanibal et al in Turkey demonstrated that *H. pylori* infection can be related to ABO blood group (34). They found that blood groups O and A are more prone to *H. pylori* infection than other blood groups. No statistically significant differences are observed in mean values of Ig G antibody among different groups (ABO and Rh D Factor) in blood donors in Kosovo. The data recorded from Martin et al (30), also have not found differences in mean value of IgG antibody among blood groups.

Conclusions

The seropositivity of *H. pylori* is moderately high in the non voluntary and voluntary blood donors, unrelated to gender. There is not noted a significant relationship between infection with *H. pylori* and ABO/Rhesus blood group among Kosovo's blood donors.

Competing interests

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