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Full length Research paper

Helicobacter pylori infection on medical students: A study on MAG Osmani Medical College, Bangladesh

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An attempt had been made to investigate the seroepidemiology of *Helicobacter pylori* infection with influencing factors affecting the new entrants and final year medical students. The study was based on the analysis of primary data taken from new entrants and final year MBBS students of Sylhet MAG Osmani Medical College, Bangladesh. To detect *H. pylori* IgG among first year and final year medical students, we compared the seroprevalence of *H. pylori* IgG between two groups and found influencing factors affecting the seroprevalence and any association between them. In this study, 80 students from each group were studied. Relevant variables were taken in a pre-designed questionnaire. *H. pylori* IgG was detected by using ELISA method. The study showed that in first year 41 (50%) and in final year 47 (about 59%) students were *H. pylori* IgG positive respectively. Numerically final year students were more affected by *H. pylori* than new entrants. The study revealed that in first year, positive seroprevalence of *H. pylori* significantly differed with only travel history of students. On the other hand, in final year, positive seroprevalence of *H. pylori* significantly differ with gender of students. Further study needed to be carried out for large scale population to make general inference about seroepidemiology of *H. pylori.*

Key words: *Helicobacter pylori,* seroprevalence, seroepidemiology.

INTRODUCTION

Gastritis has become a common health problem in Bangladesh. Young and adult populations have complaints of various gastrointestinal problems here. Early detection and treatment could help to maintain their good health. In developing countries, more than 80% of the population is *H. pylori* positive (Perez-Perez et al., 2003). Oral ingestion of the bacterium causes infection; evidence suggests that oral-oral, gastric- oral, and fecal-oral routes of transmission of *H. pylori* infection exist (Czinn, 2005). *H.pylori* is urease, catalase, and oxidase positive; it can catabolize glucose (Kusters et al., 2006). *H. pylori* infection can be diagnosed by several techniques such as Gram-stained smears of biopsy specimen of the gastric mucosa, culture on Skirrow's medium. It can also be diagnosed by noninvasive diagnostic tests such as urea breath test, detection of *Helicobacter* antigen in the stool for confirmation, and detection of IgG antibodies in the patient's serum (Levinson, 2006).

Lower socioeconomic status, lower levels of education, poor hygiene and sanitation, household crowding were associated with a higher prevalence of *H. pylori* infection (Bardhan, 1997). Bangladesh is a densely populated developing country. Lack of food hygiene and indecent sanitation are very common here. These create favorable environment for getting infection with *H. pylori* in crowded places like hostels, hospitals, restaurants etc.

Since gastritis is very common in Bangladesh, it is expected that almost every person will be seropositive for *H. pylori* infection at their adolescence. Ahmed et al. (1997) in their study, have shown that in Bangladesh, the prevalence of *H. pylori* infection among infants, children, and adults were 61, 84 and 92% respectively. Another study was carried out among patients in Sylhet MAG Osmani Medical College hospital Bangladesh by another group of researchers. They have found that age related prevalence of *H. pylori* infection was high in the

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investigated groups and overall 70% was positive for infection with *H. pylori* (Ahmed et al., 1997).

Studies have shown that there are risks of *H. pylori* infection in the medical personnel. In Shanghai, Liu et al. (1996) carried out a study among medical staff. They found the overall prevalence of *H. pylori* infection in total medical staff was 70.0%, compared to 44.6% in general population ($P < 0.0001$). In many hospitals, patients, attendants and caregivers share the same food court or restaurant in and around the hospitals.

Newly admitted first year medical students in Sylhet MAG Osmani Medical Collage generally come from economically solvent families and had less chance of exposure to enterically transmitted microorganisms. In Bangladesh, usually a family with a monthly income about 10000-30000 taka (about 142 - 420$) is considered an economically solvent family. On the other hand, an increased chance of seropositivity of *H. pylori* in the final year students is seen although most of them are also from solvent families. This could be the result of the close contact with the patients in the hospital. These students come into the hospital throughout the duration of more than four years of their stay at the campus with two years of clinical studentship. They also share similar poor workplace environment like those of their senior professional colleagues. In addition to the above mentioned factors, their living conditions and food habit during their long stay in the campus might have effects on seroprevalence of *H. pylori* as well. Until now, this area remained fairly unexplored. The difficulty in controlling the various confounding factors in population based seroepidemiological studies can largely be avoided in the present study due to the very nature of this defined educated population.

The present study was designed to explore the impact of such close contact on *H. pylori* seropositivity in final year medical students. First year medical students were taken as control. The study was designed to observe the seroprevalence of *H. pylori* in the newly admitted first year medical students who just came from apparently protected, hygienic home environment, and the final year medical students who have spent five years in the medical college campus.

This study will help to determine the risk of enterically transmitted organisms in medical students. It will evaluate the effect of food habit and lifestyle in the seroconversion rate of *H. pylori* among medical students. It will be the first study in Bangladesh to find-out the seroprevalence of *H. pylori* infection among the medical students attached to a tertiary level hospital in Sylhet, Bangladesh.

Objectives of the study

To study the seroepidemiology of *H. pylori* infection and/with other influencing factors effective in new entrants and final year medical students of Sylhet MAG Osmani Medical College, Bangladesh. The specific objectives are: To detect the *H. pylori* IgG in the newly admitted and final year medical students, to compare different socio-demographic variables between these two groups, and to observe whether change of lifestyle affects the seroprevalence.

MATERIALS AND METHODS

Data and sample

This was a cross-sectional, comparative study and was conducted in the Department of Microbiology, Sylhet MAG Osmani Medical College, Bangladesh. The study period was January 1st, 2007 to December 31, 2007. The total study population was 324 (1^{st} year 178 and 5^{th} year 146) containing first year (Group A, aged 18- 20 years old) and final year students (Group B, aged 22-24 years) of this college. Group A was used as control, and from the 178 students of this group, 80 students (40 male and 40 female) were randomly selected as sample. Ten students from first year were excluded due to exclusion criteria. Group B contained 146 students, and from these 146 students, 80 (40 male and 40 female) were selected as sample. Since they fulfilled the inclusion criteria, all were enrolled. It is noteworthy here that at first we selected the first and final year students as a population and next we used simple random sampling to select our sample from the population. The total sample size was thus 160. The history of the students was recorded in a predesigned data collection sheet.

Collection of specimen

Blood samples were collected aseptically in a sterile test tube with disposable syringes. Approximately 3 ml of blood was collected from each participant by venupuncture (within 15 days of enrollment). Each blood sample was allowed to clot at room temperature for 30 min; serum was obtained by centrifugation (2000 rpm) for 20 min and transferred to microcentrifuge tubes. The tubes were capped, labelled and stored at −20°C.

Enrollment criteria

Inclusion criteria

The inclusion criteria is first year and final year medical students who were staying at the hostels of Sylhet MAG Osmani Medical College, Bangladesh.

Exclusion criteria

1. History of blood transfusion during the month preceding the study;
2. History of hospitalization during the last six months;
3. Students staying at home during the 5^{th} year, and
4, First year students who stayed at the hostel previously (some students might have previously stayed at residential high schools).

Estimation of *H. pylori* antibody by ELISA

Estimation of anti *H. pylori* IgG antibody in the blood was done using *H. pylori* kits manufactured by DRG International, Inc., USA; Lot No-JG 7060-22. Competitive ELISA was done.

Table 1. Association between seroprevalence of *H. pylori* and socio-economic status and gender.

Name of the variables	*H. pylori*					
	First year		Chi-square	Fifth year		Chi-square
	+VE	-VE		+VE	-VE	
Occupation of father						
Service	27(65.9)	24(61.5)		28(59.6)	22(66.7)	
Business	13(31.7)	12(30.8)	1.17	14(29.8)	7(21.2)	0.74
Others	1(2.40)	3(7.70)		5(10.6)	4(12.1)	
Occupation of mother						
Housewife	35(85.4)	30(76.9)	0.94	37(78.7)	27(81.8)	1.41
Service	6(14.6)	9(23.1)		9(19.1)	4(12.1)	
Gender of students						
Male	22(53.7)	18(46.2)	0.45	30(63.8)	10(30.3)	8.72**
Female	19(46.3)	21(53.8)		17(36.2)	23(69.7)	

** Significant at 5% level ¥ figures within the parenthesis indicate percent of the column.

Variables

In this study binary response variable *H. pylori* (positive=1 and negative=0) was considered. To evaluate the effects of socioeconomic condition on seropositivity of anti *H. pylori*, parents' occupation was recorded. Other covariates like gender of the students, travel history, habit of carrying bottled water during traveling, habit of taking food outside residence, and source of drinking water were considered.

Statistical methods

For bivariate analysis, the Chi- square test was used to identify the association between *H. pylori* lgG and other variables. To make more accurate inference multiple logistic regression models were fitted. In this analysis, only 5% level of significance was considered.

RESULTS

Most of the medical students came from middle to high-middle income families in both groups (A, B). Nearly all of the first year and final year medical students came from urban residence. Most of the families of the students in both groups used drinking water from deep tube wells. Almost all of the respondents' families of both groups had access to sanitary latrines. In first year (Group A), 41 students (about 50%) and in final year (Group B), 47 students (about 59%) were found to be *H. pylori* lgG positive.

Table 1 shows association between seroprevalence of *H. pylori* lgG and socio-economic and gender variables. Occupation of parents had no significant impact on *H. pylori* lgG positivity in both first year final years. Most of the students' fathers were service holders or businessmen, and their mothers were housewives. In final year among the *H. pylori* lgG positive students, 60% were male and 36% were female and the association was statistically significant.

Table 2 shows the association between seroprevalence of *H. pylori* and food habit of students. In first year, 80% students and in final year, 96% students were taking food from outside residence that had *H. pylori* lgG positivity, but the association in between variables was not significant. Travel history has significant impact on positive seroprevalence of *H. pylori* lgG in the first year students and it had no significant effect on final year students. Association of taking meal during travel, bottled water during travel and seroprevalence of *H. pylori* lgG was not significant.

Table 3 shows the parameter estimates and standard error for logistic regression analysis of both group students. The results confirmed that gender of the students for fifth year and travel history for first year students had significant effect on *H. pylori* lgG. The same result was observed from bivariate analysis.

DISCUSSION AND CONCLUSION

H. pylori is a gram-negative, microaerophilic bacterium that can inhabit various areas of the stomach and duodenum. It causes a chronic low-level inflammation of the stomach lining, and is strongly linked to the development of duodenal and gastric ulcers. The main goal of the study was the seroepidemiology of *H. pylori* infection and/with other influencing factors affecting in new entrants and final year medical students of Sylhet MAG Osmani Medical College, Bangladesh. Pearson chi-square test and multiple logistic regression analysis were done to find out significant factors.

In this study, anti-*H. pylori* seropositivity was found to be higher in final year students. This finding was

Table 2. Association between seroprevalence of *H. pylori* and food habit of students.

Name of the variables	*H. pylori*					
	First year		Chi-square	Fifth year		Chi-square
	+VE	-VE		+VE	-VE	
Habit of taking food outside residence						
Yes	33(80.5)	35(79.7)	1.34	45(95.7)	30(90.9)	0.77
No	8(19.5)	4(10.3)		2(4.3)	3(9.1)	
Travel history of students						
Travel frequently (once or more in a month)	7(17.1)	14(35.9)	3.66**	27(57.4)	22(66.7)	0.69
Not frequently	34(82.9)	25(46.1)		20(42.6)	11(33.3)	
Take meal during travel						
Home made	20(48.8)	15(38.5)	0.87	26(55.3)	21(63.6)	0.55
Restaurant	21(51.2)	24(61.5)		21(44.7)	12(36.4)	
Take bottled water during travel						
Yes	22(53.7)	17(43.6)	0.81	27(57.4)	23(69.7)	1.24
No	19(46.3)	22(56.4)		20(42.6)	10(30.3)	

** Significant at 5% level; ¥ Figures within the parenthesis indicate percent of the column.

Table 3. Multiple logistic regression analysis for both groups of students.

Name of the variables	Estimate (S.E.)	
	First year	Fifth year
Intercept	-9.866(6.518)	-12.718(9.850)
Gender of students (male)	0.553(0.567)	-1.659(0.590)**
Habit of taking food outside residence (yes)	0.700(0.707)	0.810(1.029)
Travel history of students (travel frequently)	1.166(0.580)**	-0.200(0.548)
Take meal during travel (home)	-0.044(0.532)	-0.085(0.557)
Take bottled water during travel (yes)	-0.654(0.586)	-0.304(0.530)

** Significant at 5% level; S.E-standard error.

consistent with a study that was conducted by Lin et al. (1994) in Australia to find prevalence of *H. pylori* infection in endoscopy staff and among medical staff. They had found that the prevalence of *H. pylori* infection increased in medical personnel with age and years of working, and proposed nosocomial transmission of *H.pylori* to care givers to explain their findings. In final year students, similar mechanism might be operative as they frequently come in close contact with patients during their clinical learning and practicing sessions.

Travel history had play significant role on first year students in seroprevalence of *H. pylori* lgG. First year group who just started to travel may become sick due to the fact that they were new to frequent traveling, and were not exposed to *H. pylori* as much in their household environment before. In final year, travel history was not significant for *H. pylori* lgG. More male students were found seropositve for *H. pylori* lgG than female students, and the difference was highly significant (P = 0.01). This result was consistent with Murray et al. (1997) who carried out a study in a geographically distant area from Northern Ireland and found that *H. pylori* infection was more common in males (60.9%) than females (55.2%).

In this study, we found that medical students residing in hostels were taking food outside residence but this habit had no significant effect on positive seroprevalence of *H. pylori* in both groups of students. We could say that student's *H. pylori* antibody status was not affected by food habit in the campus. Lack of food hygiene is one of the causes for *H. pylori* infection, but the final year students were not seen to be significantly affected by *H. pylori* even after eating at the restaurants around Sylhet MAG Osmani Medical College campus for about five years. Hence, it could be inferred that these outside residence food sources most likely maintain a supply of safe drinking water and hygienic food.

In conclusion, the study disclosed that the first year students who traveled frequently were more affected with *H. pylori*. On the other hand, in final year, the effect of *H. pylori* varied significantly depending on the gender of the students. From the analysis, several interesting observations emerged, although there are obvious limitations to exploit these findings to interpretational level imposed by the small sample size. The following recommendations are made on the basis of this study:

1. Specific appropriate preventive strategy should be developed and implemented at institutional, community, and personal level to minimize the risk of exposure in and outside of the hospital environment.
2. The emerged epidemiological information in the present study on *H. pylori* requires to be validated with large scale population based study.
3. Students should be aware about the demerits of taking contaminated food during frequent traveling.

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