

Seroprevalence of *Helicobacter pylori* Infection in Adults in the Bahamas

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ABSTRACT

Objectives: A number of studies have evaluated *Helicobacter pylori* (*H pylori*) infection in the Caribbean. However, to date there is no available epidemiological data on its occurrence in the Bahamas. Therefore, we determined the seroprevalence of *H pylori* in a healthy adult population in Nassau, Bahamas.

Methods: A prevalence study was conducted using volunteer blood donors to the blood bank at Princess Margaret Hospital, the only public hospital in Nassau, Bahamas. Sera collected were screened using enzyme linked immunosorbent assay (ELISA) for antibodies to *H pylori*.

Results: Two hundred and four persons were screened for *H pylori* in this study. Prevalence of *H pylori* in the study population was 58%.

Conclusion: *Helicobacter pylori* infection is a common chronic infection in Nassau, Bahamas. Published seroprevalence rates for this infection in other Caribbean territories range from 55% to 70%.

Keywords: Bahamas, Caribbean, *Helicobacter pylori*, Seroprevalence

Seroprevalencia de la Infección por *Helicobacter pylori* en Adultos de Bahamas

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RESUMEN

Objetivos: Ciertos estudios han evaluado la infección por *Helicobacter pylori* (*H pylori*) en el Caribe. Sin embargo, hasta la fecha no hay datos epidemiológicos disponibles en relación con su incidencia en las Bahamas. Por tal motivo, nos dimos a la tarea de determinar la seroprevalencia de *H pylori* en una población de adultos sanos en Nassau, Bahamas.

Métodos: Se llevó a cabo un estudio de prevalencia utilizando sangre de donantes de sangre voluntarios, del banco de sangre de Hospital Princess Margaret – el único hospital público en Nassau, Bahamas. Los sueros recogidos fueron tamizados mediante ensayo inmunoabsorbente ligado a enzimas (ELISA) en busca de anticuerpos frente al *H pylori*.

Resultados: Doscientas personas fueron sometidas a pesquisa de *H pylori* en este estudio. La prevalencia de *H pylori* en la población de estudio fue 58%.

Conclusión: La infección por *Helicobacter pylori* es una infección crónica común en Nassau, Bahamas. Las tasas de seroprevalencia publicadas en relación con esta infección en otras áreas del Caribe fluctúan de 55% a 70%.

Palabras claves: Bahamas, Caribe, *Helicobacter pylori*, seroprevalencia

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INTRODUCTION

Researchers have confirmed that there is an association between *Helicobacter pylori* and most cases of peptic ulcer disease (1, 2). Further research has demonstrated a

relationship between *H pylori* and gastric cancer (3, 4). *Helicobacter pylori* eradication is now standard of care in peptic ulcer disease when the infection is confirmed. The role of treatment of this bacterium in reducing the incidence of gastric cancer provides a fertile area for research. The development of vaccines against *H pylori* is well underway (5). There is debate on the need or the cost-effectiveness of a national vaccination programme.

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The Bahamas is an archipelago of over 700 islands and keys. The population is estimated at 305 000. Sixty per cent of the population live in the capital Nassau. Eighty-five per cent of the population is of African descent; 15% is white or mixed. At present, there is no information regarding the prevalence of *H pylori* in the Bahamas. The aim of this study is to determine the prevalence of *H pylori* and in addition, provide a platform for further research into the burden that *H pylori* related diseases are placing on the healthcare system in the Bahamas. *Helicobacter pylori* can be successfully treated using readily available triple therapy. The fact that *H pylori* associated diseases may be effectively controlled or eradicated by treatment, underscores the importance of research in this area.

SUBJECTS AND METHODS

Chronic *H pylori* infection elicits a circulating IgG antibody response that can be quantitatively measured by enzyme linked immunosorbent assay (ELISA) test. The main advantage of serological tests is that it enables large numbers of subjects to be screened quickly and relatively inexpensively.

The study population was adult volunteer donors presenting to a major blood drive conducted by the blood bank of Princess Margaret Hospital, Nassau, Bahamas. The sampling design was consecutive. All donors presenting during the two days of the blood drive were allowed into the study. The samples collected were stored at 2–8 degrees Celsius. All samples were tested at the Princess Margaret Hospital Laboratory Services. Sera collected were screened for antibodies to *H pylori* using ELISA with a positive result defined as an IgG concentration above 10 U/ml. This study received approval from the Ethics Committee at the Public Hospital Authority in Nassau, Bahamas.

Patients' characteristics including gender, age and blood type were collected by a standard data form. Proportions of gender, age and blood type were compared between the *H pylori* positive and negative group by the Pearson's Chi-Square test; Fisher's exact test was used when appropriate. Statistical analysis was performed by using the Statistical Package for Social Sciences (SPSS, v.12.0, Chicago, IL, USA). Statistical significance was pre-defined as two side p -value < 0.05.

RESULTS

Two hundred and four individuals who presented to a local blood drive were enrolled in this study. The population consisted of 117 males and 87 females. *Helicobacter pylori* results were obtained for 203 participants. The table provides a summary of the results. The ages ranged from 16 to 61 years with the 15–25-year age category having the majority of individuals tested at 31% (n = 63).

One hundred and nineteen participants tested positive for *H pylori*. The prevalence of *H pylori* in the study population was 58.3%; 72 males and 47 females tested positive for *H pylori*. There was no statistically significant

Table: Summary of results

	Total n (%)	<i>H pylori</i> +ve n (%)	<i>H pylori</i> –ve n (%)	Missing n (%)
All subjects	204	119 (58.3)	84 (41.2)	1 (0.5)
Gender (p 0.32)*				
Male	117	72 (61.5)	45 (38.5)	0 (0)
Female	87	47 (54.0)	39 (44.8)	1 (1.2)
Age¹ (p 0.20)*				
15–25	63	31 (49.2)	32 (50.8)	0 (0)
26–35	47	28 (59.6)	19 (40.4)	0 (0)
36–45	56	33 (58.9)	23 (41.1)	0 (0)
46–60	35	25 (71.4)	9 (25.7)	1 (2.9)
> 61	2	1 (50.0)	1 (50.0)	0 (0)
Blood Group² (p 0.07)*				
A+	43	25 (58.1)	18 (41.9)	0 (0)
A-	3	0 (0)	3 (100)	0 (0)
B+	38	25 (65.8)	13 (34.2)	0 (0)
B-	1	1 (100)	0 (0)	0 (0)
AB+	7	1 (14.3)	6 (85.7)	0 (0)
AB-	1	1 (100)	0 (0)	0 (0)
O+	103	62 (60.2)	40 (38.8)	1 (1)
O-	6	4 (66.7)	2 (33.3)	0 (0)

¹One missing entry

²Two missing entries

* p -value shows relationship between grouping (age, gender *etc*) and *H pylori* positivity

difference, using the Pearson Chi-squared (two-sided) test based on gender ($p > 0.05$).

The results indicate that there is an increase in seropositivity between ages 15 and 60 years, with highest positivity in the 46–60-year age group. There was little difference in seropositivity between the ages 26–35-year and 36–45-year age group (Figure). However, a statistically

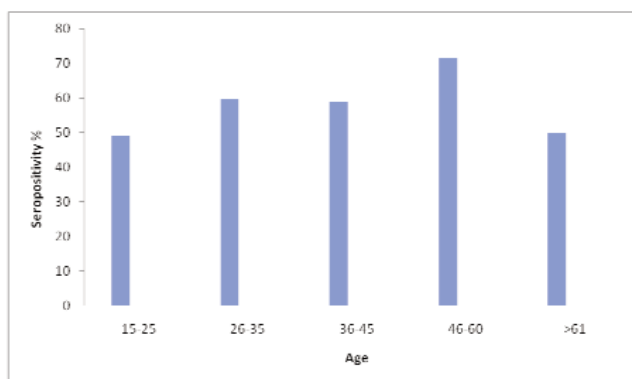


Figure: Distribution of seropositivity to *H pylori* according to age class.

This chart displays increasing seropositivity from the 15–25-year age group to the 26–35-year age group. Seropositivity plateaus between the 26–45-year age classes and rises again in the 46–60-year group.

significant relationship was noted with *H pylori* positivity and increasing age when the 46–60-year age category (71.4%) was compared to 15–25-year category [49.2%] ($p = 0.03$). A decline in seropositivity was noted in the > 61-year age group (50%). However, only two participants were in this age group.

In the samples obtained, 'O positive' is the predominant blood type ($n = 103$) followed by 'A positive' ($n = 43$). Of those with 'O positive' blood, 60% tested positive for *H pylori*. However, blood grouping had no statistically significant relationship with *H pylori* seropositivity.

DISCUSSION

Helicobacter pylori infection is a worldwide infection and is one of the more common chronic infections. We report a seroprevalence of 58.3% in a healthy adult population in Nassau, Bahamas. This seroprevalence is much lower than that reported in Barbados [72%] (6) and Jamaica [70%] (7), but similar to Guadeloupe [55%] (8). Overall, the Caribbean has a seroprevalence that is at least double that seen in the United States of America [25%] (9).

Although we did not demonstrate a significant relationship between age and *H pylori* seropositivity, there was a definite trend with increasing age. This is widely believed to represent a cohort effect (6, 7). The present study noted a lower prevalence than expected in the oldest group (over 61-years category). This may be explained by the small number studied in this category ($n = 2$). In addition, there is a suggestion that atrophy of the gastric mucosa in the elderly is associated with loss of *H pylori* (10). A similar lower prevalence in the oldest category was reported in a Barbadian study in 1997 (6).

Prevalence studies using biopsy-based methods at endoscopy (rapid urease test) in the territory reveal lower prevalence rates. Prevalence rates reported range from 54% in Barbados (6), 55% in Jamaica (11) and 55% in Guyana (12) in symptomatic patients.

A widely held view is that the differences seen in prevalence rates across the Caribbean and worldwide may be related to standard of living (13). The United Nations Human Development Index (2010) ranks Barbados at #42 and Bahamas at #43; however, Barbados has a significantly higher prevalence rate than the Bahamas (14). Rarely studied factors such as genetic predisposition, frequency of antibiotic use and mode of transmission might explain the different prevalence rates in the Caribbean when economic factors alone do not.

Evidence supporting genetic contribution to *H pylori* infection includes blood group studies and twin studies. Malaty and colleagues in 1994, evaluated the relationship between *H pylori* infection and concordance of twin status (15). This study confirmed that monozygotic twins had a higher rate of concordance than age-matched dizygotic twins. In addition, there was a high concordance in monozygotic

twins reared apart, suggesting that genetic factors contribute to determining who will ultimately be infected.

The mechanism of this genetic susceptibility is not yet established. It is suggested that Lewis blood group antigen mediated attachment of *H pylori* to the gastric mucosa (16). The present study, among others, failed to find any significant association between ABO blood group and *H pylori* infection (17).

The mode of transmission of *H pylori* remains controversial. *Helicobacter pylori* has been detected by polymerase chain reaction (PCR) in faeces (18) and saliva (19) suggesting faecal-oral and oral-oral transmission. Oral-oral has been challenged by the fact that dentists and dental staff are not at increased risk of infection. Transmission of *H pylori* by houseflies was noted in 1997 (20) and 1998 (21) but no further studies evaluating this mode of transmission have been published. Person to person spread *via* faecal-oral route is widely believed to be the likely mode of transmission, but this matter is far from resolved.

The lower prevalence reported in the present study could also be explained by a reduction in *H pylori* prevalence regionally and could therefore represent a cohort effect. However, at present there is no data to support this postulate.

In conclusion, the seroprevalence rate reported in this study confirms that *H pylori* remains a common infection in the Bahamas. Economic factors alone do not explain the varying prevalence rates in the Caribbean. Additional research to evaluate other risk factors for this infection in the Caribbean is definitely warranted.

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