ORIGINAL ARTICLE

Prevalence of Helicobacter pylori and its association with chronic diseases in Al-Majmaah population

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Abstract

Background:A retrospective and descriptive study of confirmed Helicobacter pylori (HP) cases was observed for the prevalence of HP infection in Majmaah area with respect to age and gender of the subjects and seasonal variation. Furthermore, the association of HP with a number of other chronic diseases was also correlated.

Methodology:Data for 276 confirmed HP cases were retrieved from King Khalid Hospital (KKH) in Majmaah City (Riyadh Pegion, KSA) between 2011 and 2015 and analyzed retrospectively with respect to the gender and age of the patients and seasonal variation in HP prevalence in different months of the year was also observed. Association of HP with other chronic diseases like diabetes and hypertension was also investigated. Descriptive and inferential statistics were also calculated for all data.

Results: This retrospective descriptive study revealed that prevalence of HP during five years, there were 276 HP confirmed cases. On an average, most cases were diagnosed during the first five calendar months, starting from January through May. The maximum number of 38 cases of HP infection was observed in May followed by 36 cases in March. On the other hand, the minimum number of cases was

الملخص

قامت هذه الدراسة برصد حالات الاصابة السابقة بميكروب جرثومة المعدة في منطقة المجمعة ومدى تلازمها مع الفئة العمرية و الجنس اضافة لعلاقة الاصابات باختلاف المواسم . اضافة لذلك تم دراسة تلازم الاصابة بالميكروب مع أمراض مزمنة معينة

طريقة العمل : تم رصد ٢٧٦ حالة مصابة بجرثومة المعدة من خلال سجلات مستشفى الملك خالد بمحافظة المجمعة للفترة الممتدة من عام ٢٠١١ الى عام ٢٠١٥ أ مع تحليل لهذه النتائج وربطها بجنس المصاب وفئته العمرية وموسم حدوث الاصابة خلال أشهر السنة. كما تم استقراء مدى التلازم بين تلك الاصابات ووجود أمراض مزمنة لدى المصابين خاصة مرض السكري وارتفاع ضغط الدم . وتم اجراء التحليل الاحصائي لكافة النتائج.

النتائج : أظهرت نتائج هذه الدراسة الوصفية الاستقرائية لظهور الاصابة بجرثومة المعدة وذلك خلال الفترة الممتدة لخمس سنوات وجود ٢٧٦ حالة اصابة مؤكدة . معظم الحالات تم رصدها خلال الأشهر الخمسة الأولى من يناير وحتى مايو. أعلى متوسط لحالات الاصابة تم رصدها في شهر مايو وبلغت ٣٨ حالة ، تبعها شهر مارس بعدد ٣٦ حالة . ومن جهة أخرى فقد بلغت أدنى حالات الاصابة في شهر يوليو ٦ حالات يليها شهر يونيو بعدد ١٢ حالة .

الخلاصة : من بين مراجعي مستشفى الملك خالد

reported in July with only 6 cases followed by June with 12 cases.

Conclusion:Out of estimated total number of annual visitors (75420) to KKH, 276 symptomatic HP infected patients wereconfirmedover five years. The number of cases identified was 2, 160, 84, and 30 in the age group 0-14, 15-39, 40-64, and ≥ 65 years respectively. Hypertension was found to increase with age, whereas the diabetes was not linear with increasing age.

بالمجمعة والذي يقدر عددهم بخمسة وسبعين ألفا وأربعمائة وعشرين مريضا أظهر مئتين وستة وسبعين منهم أعراض الاصابة بجرثومة المعدة خلال مدة الدراسة البالغة خمس سنوات . توزعت حالات الاصابة بعدد بلغ حالتين مئة وستين أربعة وثمانين وثلاثين للفئات العمرية ٠-٤ ، ١٥-٣٩ ، ٤٠-٦٤ ، و ٦٥ عاماً على التوالي . حالات الاصابة بالميكروب التي تلازمت مع مرض ضغط الدم وجد أنها تزداد بزيادة العمر بينما لم يرصد ذلك في الاصابات المتلازمة مع مرض السكري .

Introduction

HP is one of the world's most common bacterial infections. It has two to six flagella that give it the mobility to withstand rhythmic gastric muscle contractions and helps it to penetrate the gastric mucosa(1). HP produces urease to create an alkaline environment[1], which enables the organism to survive in the acidic stomach.Colonization usually persists for years or even decades. It is estimated that HP colonizes stomachs of around 50 % of world's population. The world health organization has classified HP as a group 1 carcinogen for gastric adenocarcinoma.[2] Although humans are the principal reservoir of this pathogen, closely related similar organisms have also been found in primates.[1] Although. The organism is generally acquired during the childhood by the fecal-oral, oral-oral or gastro-oral route[3]. Consistent with these transmission routes, these bacteria have been isolated from feces, saliva and dental plaque of some infected people. Transmission occurs mainly within families in developed nations yet can also be acquired from the community in developing countries. HP may also be transmitted orally by means of fecal matter through the ingestion of waste-tainted water, thus a hygienic environment could help decrease the risk of HP infection.

Antibodies of HP found in human serum are indicators for this infection. Positive HP IgG with high sensitivity and specificity have been reported from various countries for diagnosis of HP infection.[4] HP DNA has been detected by polymerase chain reaction in sewage water. It can survive for several days in distilled water; saline and sea water if these are kept cool. However, at room temperature they become non-cultivable after one to three days. It is possible that particulate matter could be providing a more favorable local environment and increases it's survival time.Most people (over 80%) infected with HP show no symptoms as these are "silent" and produce no symptoms.

The prevalence of HP infection is not uniform between societies, and it varies both geographically and according to social and ethnic group. This infection around

the world ranges between 20% and 90% in adult populations[5]and is more prevalent in developing countries, since it is associated with poverty and social deprivation[6]. The prevalence in developing countries ranges between 49.1% and 87% in adults,[7, 8]but it is decreasing in some of these countries like South Korea[13] , Brazil [16] and Japan [16]. The main risk factors for HP infection include overcrowded households, poor sanitation and poor water supply.[6] However, in developed countries the prevalence ranges from 11% to 32% in adults, and 10% to 16.7% in children[9, 10]. During the twentieth century in developed countries, a decrease in prevalence of HP was observed accompanied by a corresponding decrease in the incidence of gastric cancer and peptic ulcer disease.[11] Majority of the population of the developing world is infected by HP from an early age. Growing efforts are being placed on developing strategies to reduce the prevalence of the infection in developing countries, because gastric cancer is even more prevalent in these countries.[12]

For instance, a recent study in South Korea showed that there had been a significant decrease over the seven-year period from 1998 (66.9%) to 2005 (59.6%).[13]The prevalence ranges from 9% to 78.6% among schoolchildren in developing countries,[14, 15]and in Brazil it ranges from 2.4% to 66.5%.[5, 16]Infection prevalence is higher in socioeconomically deprived communities and lower among individuals of Japanese descent.[16]

The prevalence of HP infection in Saudi Arabiahas noticeably increased with respect to age. It rose from 32.4% in those aged 5–10 years, more than 66.4% for those aged 20–30 years, and 75% in those over 50 years. On the other hand, reports showed that HP infection prevalence in the country was 68–82.2% in the 1990s.[17]With its estimated population in Majmaa city approaching to 133285 (both Saudis and non-Saudis), out of them 77929 are men and 55356 women, Majmaah City can be considered as a representative example of the semi-rural region in Saudi Arabia.

Infection with HP is associated with chronic gastritis and peptic ulceration, and the bacterium is also considered a risk factor for developing gastric adenocarcinoma and mucosa-associated lymphoid tissue (MALT) lymphoma.[18] In a study from Saudi Arabia, the well-described association of HP with non-ulcer dyspepsia was confirmed.[19]

The relationship between HP infection is often associated with other chronic diseases in humans like diabetes mellitus [30], hypertension [31] and obesity [32] .

The current study aimed at determining the prevalence of HP in the population of Majmaah cityduring a period of five years between 2011 and 2015.

Methodology

This study is a retrospective cross-sectional study, of all proved cases of HP in King Khalid Hospital - Majmaah - Riyadh Province (276 patients). We retrieved their

medical records from endoscopy unit database and internal medicine clinics database to extract data including demographic characteristics, personal medical history, and prognostic factors related toHPincluding diabetes and hypertension**.** The study period is from 2011- 2015.

Data analysis: Data wereanalyzed using statistical software Package of Social Science (SPSS 20 for windows evaluation version). In addition, $\chi 2$ tests were used for categorical variables and the Mann-Whitney U test for continuous variables; $P < .05$ is considered statistically significant.

Data management and confidentiality: Data identified initially and then coded in the database excel sheet using a unique identification number. The data stored on a password-protected laptop with PI; and all data maintained confidential. The publication only presented summary statistics and no identifying information is used.

Results

Over the five years period of the study, overall, a total of 276 confirmed cases of HP were recorded on monthly basis. Figure 1 shows the monthly prevalence of HP during each months of the five years' period. Thus, the month of January, February etc. show total number of recorded HP cases in all January, February etc. falling in the five years' study time. The figure shows on an average, most number of cases diagnosed during the first five calendar months, starting from January until May ranging from 24 to 38 cases respectively. The maximum number was observed in May (38 cases). However, in June and July the Prevalence of infection dropped drastically to as low as 12 and 6 respectively. Subsequently, from August until December the Prevalence of HP increased slightly (ranging from 13 to 24) as shown in Figure 1.

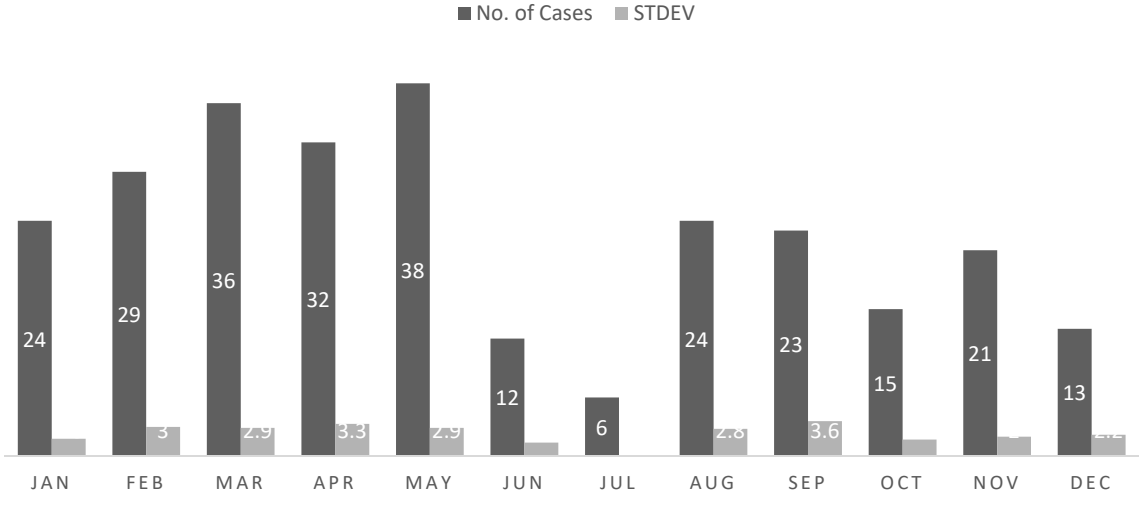


Figure 1: Incidence of *H. pylori*infections over the 12 calendar months during the entire 5 years' observation period.

Table 1: Occurrence of *H. pylori* cases with other chronic diseases concurrently.

Chronic Disease + H. Pylori	No of Cases
(Diabetes Mellitus (DM	20
(Hypertension (HTN	19
Anemia	5
(Peptic ulcer disease (PUD	4
(Gall bladder stone (G.B. stone	4
Hypothyroidism	3
(.Atrial fibrillation (A.F	2
(.Chronic Renal Failure (C.R.F	2
(.Benign Prostatic Hypertrophy (B.P.H	2
Brucellosis	1
(Gastro esophageal reflux disease (GERD	1
(.Bronchial asthma (B.A	1
(.Ischemic Heart Disease (I.H.D	1
Thyroiditis	1
Anorexia	1

Table (2): Age distribution among patients with diabetes mellitus (DM) & H. pylori infection concurrently

Age group in years	Total HP cases	No. of Patients with HP + DM	Percentage of patients with DM + HP
1 – 14 yrs	02	0	0.0%
15 – 39 yrs	160	3	1.9%
40 – 64 yrs	84	10	11.9%
≥ 65	30	7	23.3%
Total	276	20	37.1%

The prevalence of HP infections was higher in the age group between 15-39 years old. The distribution of HP infections cases was 2, 160, 84 and 30 for the age groups 0-4, 5-14, 15-39 and 40-64 and ≥ 65 years old respectively.

Different chronic diseases in addition to HP if and when were observed in the patient's files were also recorded. As shown in Table1, out of the 276 confirmed cases with HP, the patients were also suffering from some chronic diseases. The main diseases included

diabetes and hypertension (number of cases 20 and 19 respectively) with other chronic diseases but at low incidence ranging from 1 to 5 cases (Table 1).

Although most of the HP cases (56%) were observed in the age group (15-39 years) of the total cases (Table 2), it is difficult to link this age group with the HP prevalence, due to the fact that this group is already contributing to the half population of the Kingdom of Saudi Arabia. Therefore, it is expected that higher number of cases would be fall in this group. However, the results show gradual increase in concurrent occurrence of HP and diabetes cases with the age factor. The percentage of patients having both diseases was 23.3%, 11.9%, 1.9% and 0% corresponding to the age groups ≥65, 40-64, 15-39, and 1-14 years respectively.

Similar to the data observed for HPI and diabetesare observed with hypertension as shown in Table 3.However, 30% of patients ≥ 65 years old were found to suffer from hypertension, comparing to 23.3% who suffer from diabetes among the same age group.

Discussion

This retrospective descriptive study revealed that over the five years between December 2010 and September 2015, the average annual visitors to KKH in Majmaah isaround 75.000. There were at least 276 HP confirmed cases. Earlier published investigations have found that HP Infection increases with age. [20] Whereas different pattern was found here where the second age group (15-39 years old) registered the highest cases. This difference might be attributed, at least partially, to the fact that the majority of the Saudi population is under 40 years old,according to the General Authority for Statistics in the kingdom of Saudi Arabia.The age group between 15-39 years old is contributing to 45% of the total population.

Association between HP infections and different chronic diseases was investigated in many earlier published studies where patients had chronic diseases concurrently when they were diagnosed for HP infection [21, 22]. The most associated chronic diseases with HP infection cases were diabetes and hypertension with 20 and 19

Table (3): Age distribution among patients with hypertension (HTN) & H. pylori infection concurrently

Age group	Total HP cases	No. of Patients with HP + HTN	Percentage of patients with HTN + HP
yrs 14 – 1	02	0	0.0%
yrs 39 – 15	160	3	1.9%
yrs 64 – 40	84	7	8.3%
65 ≤	30	9	30%
Total	276	19	40.2%

cases respectively. He et al., (2014) reviewed the association between HP infection and Diabetes andthey found a strong relationship between HP infection and the incidence of type 2 diabetes mellitus (T2DM), formerly known as non-insulin-dependent diabetes mellitus or adult-onset diabetes.[22]

Many evidences suggest that HP infection is associated with diabetes, and may cause insulin resistance and chronic inflammation that contribute to the disease[30]. HP -induced gastritis can potentially affect the secretion of gastric-related hormones and inflammatory cytokines[27, 28]. Relation between HPI and DM is complex and goes both directions where one diseases lead to the other one. However, further studies are warranted to define the relationship between HP infection and diabetes in more details, and to characterize the mechanisms of action [22].

On the other hand, hypertension was the second highest chronic disease to be associated concurrently with the diagnosed HP cases here with 19 patients.A significant increase in HP cases in hypertensive patients as compared to normotensives individuals has been observed. The importance of this association of HP infection with hypertension is highlighted by the possibility of an effective intervention against HP infection as the organism can be easily eradicated using simple & reliable drug regimen. However, association between HP and hypertension doesn't necessarily mean causation. [23] The association needs further investigation from prospective studies.

Conflict of Interests

The author declares that there is no conflict of interests regarding the publication of this paper.

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