

Incidence of Helicobacter Pylori Infection among Dyspeptic Children and Adults Diagnosed through Serum Antibody and Stool Antigen Tests Considering Histopathology as Gold Standard in Mayo Hospital, Lahore Pakistan

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ABSTRACT

Objective: To detect the incidence of Helicobacter pylori (H Pylori) infection in children and adults and to measure the effectiveness of three non invasive, minimally invasive and invasive diagnostic modalities at Mayo hospital, Lahore.

Design: Descriptive cross-sectional study

Place and duration: East Medical Ward, Pediatric Medical ward Unit 2, Pathology Department, Mayo hospital Lahore from November 2020 to October 2021.

Methodology: All the cases with severe recurrent or persistent symptoms of gastritis and dyspepsia referred to adult and pediatric medical outdoor and medical wards were included in the study. Specific sociodemographic details were noted. Blood and stool samples were collected and directed to Pathology department of the hospital for serum H Pylori antibody and H Pylori stool antigen tests respectively. Endoscopic guided gastric biopsy for histopathological presence of H Pylori is done in all the patients with strong recurrent or persistent clinical symptoms not responding to treatment. Results of all these tests were noted. All the variables were analyzed with respect to their percentages and proportions.

Results: Among 759 patients with symptoms of gastritis included in our study, 522 (68.7%) were found to have Helicobacter pylori infection. The incidence was more common in adults (mean age 42.5 years). Males were infected more than females. Among pediatric population, found more frequently in school going 6 to 10 years age group. H pylori stool antigen test was more reliable as compared to serum antibody test. Histopathology remained the gold standard test.

Conclusion: Helicobacter pylori infection is quite prevalent in our community. However, further researches on large scale should be conducted to find out the exact prevalence of H pylori in the whole country. The diagnostic accuracy of indirect non invasive H Pylori stool antigen test is far better than minimally invasive serology test and can be used effectively in children and adults where urea breath technique cannot be done accurately and to avoid the direct invasive endoscopic guided histopathological examination.

Keywords: Incidence, Helicobacter pylori, gastritis, dyspepsia, diagnostic tests, Histopathology, Pakistan

INTRODUCTION

Helicobacter pylori gastritis is an international community health issue, infecting > 50% of the people of this planet. The infection can occur at any age; however, the prevalence rate and age of presentation vary from region to region.^{1,2} The frequency of infection is much lower in economically sound emergent countries as compared to the third world nations.^{1,3}

Helicobacter Pylori causes a variety of gastrointestinal disorders including gastritis, peptic duodenal ulcers, gastric adenocarcinomas and lymphomas.⁴

A variety of indirect non invasive tests like H pylori stool antigen test, urea breath test, minimally invasive serum antibody tests, and direct invasive endoscopy and endoscopic guided gastric biopsy with immunohistochemistry etc are available for its diagnosis.⁵

In spite of its serious clinical implications and knowing that it is a treatable and avoidable infection, still there is hardly any data available on the comparison of precision of its diagnostic modalities as well as the prevalence of Helicobacter pylori in various regional population of Pakistan. The main purpose of this research was to find out the incidence of H Pylori infection in both pediatric and adult dyspeptic patients of Mayo hospital, Lahore along with the measure of validity of its available diagnostic tests.

MATERIAL AND METHODS

Every adult and child with features of dyspepsia and gastritis consulted in outdoor as well as admitted in medical wards were scrutinized in this research work. Detailed history with data including, age, gender, and personal/family history especially

concerning joint family system crowded households, area of living (house, work, and school), supply of available drinking water, sanitation/toilet facility and hand washing personal hygiene related things were recorded. Blood and stool samples of every patient were taken and sent to Pathology department for H Pylori specific antibody and antigen tests. Histopathological evaluation of H Pylori is done in every patient with serious persistent or recurrent clinical manifestations of gastritis for direct examination of H Pylori and also for the confirmation of the indirect test results. The results of all these tests and other details were noted on excel sheet. All the parameters were investigated and relative percentages and proportions were calculated.

RESULTS

Five hundred and twenty two 522 (68.7%) out of 759 patients having severe manifestations of gastritis in our research work appeared positive for Helicobacter pylori on histopathological examination of gastric biopsy. The infection was more frequent in adults (mean age: 42.5 years) as compared to children. Males were infected more. The occurrence was highest in school going 6 to 10 years age group among pediatric population. The diagnostic accuracies of H Pylori antibody serological test and H Pylori stool antigen tests found in our work were 55.7 % and 90.25 % respectively. The infection appeared to be more common in people living and working in congested overcrowded places with below average sanitation and hygiene facilities. Individuals' drinking water from home tanks were infected more as compared to patients drinking mineral water.

Prevalence percentage of children and adult population along with mean age, age ranges and gender

	No. and percentage of patients	Mean age (years)	Lowest-highest age range found (years)	Gender Male / Female
Children (up to 15 years)	191 (36.6 %)	10.2	3 to 15	102 (53.4%) / 89 (46.6%)
Adults (> 16 years)	331 (63.4%)	49.1	17 to 79	220 (66.5%) / 111 (33.5%)
Total	522 (68.7%)	42.5	3 -79	322 (61.7%) / 200 (38.3%)

Diagnostic test results

Name of diagnostic technique	True Negative	False Negative	False Positive	True Positive	Total
H Pylori serum antibody test	205	124	32	398	759
H Pylori stool antigen test (HPSA)	236	73	01	449	759
Histopathology	237	NIL	NIL	522	759

Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy (DA) of the tests (%)

Name of test	Sensitivity	Specificity	Positive predictive value	Negative Predictive Value	Diagnostic accuracy
H Pylori serum antibody test	76.2	86.5	92.55	62.3	55.7
H Pylori stool antigen test (HPSA)	86.0	99.57	99.7	76.37	90.25

DISCUSSION

The prevalence of Helicobacter pylori infection varies from region to region depending upon the living style, available water resources, sanitation facilities and personal hygiene habits. According to various studies conducted in Pakistan, the noted incidence span is 50% to 90%.⁶ In the present study, the overall prevalence was 68.7 % comparable to several other studies.^{6,7,8}

The cases were more common in adults (63.4%) as compared to children (36.6%). This is in concordance with several other studies conducted in Pakistan and other countries.^{3,9,10,11,12,13,14}

The mean age (42.5 years) found in study is comparable to studies by Mehmood K et al and Pourakbari B et al where the mean ages were 45 and 44.7 respectively.^{6,11}

In our research the bacterial infection affected both genders; however more common in males. Studies by Shah SR et al and Mehmood K et al also revealed similar results.^{6,15}

Among children the incidence was commonest in school going 6 to 10 years age group followed by 11 to 15 years age group.^{3,16,17}

The routes of transmission and exposure to various sources of infection increases with age due to gatherings, more chances of contact, individual to individual dissemination at school and work places; perhaps this is the reason of increase in infection rate with age.

H pylori stool antigen test proved to be more reliable indirect test as compared to antibody serology test in our research work. The false positive rate of antibody serology might be due to cross reactions because of other ongoing and superadded conditions.^{5,9,18} However certain studies reported opposite results revealing equal or more reliability of H pylori serology test; indicating the reason might be the technique and the type of kit or method used in various laboratories.^{19,20}

Individuals residing in crowded shared areas, with poor personal hygiene and with provision of below standard sanitary and consuming water resources were contaminated more with Helicobacter pylori in our study.¹⁶

CONCLUSION

H Pylori stool antigen test is better than H pylori serology; however, a combination of indirect non invasive and minimally invasive tests is required to avoid biopsy and histopathology for effective timely diagnosis and for prevention of the hazardous complications. The persistently high prevalence of H pylori infection in our community demands effective public health measures for boosting personal cleanliness practices to combat

the spread of disease by improving awareness and understanding of the risk factors.

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