

Seroprevalance of *Helicobacter pylori* in undernourished children: A hospital based study

Malik S¹, Sharma S², Dwivedi R³

¹Dr Shikha Malik, Associate Professor, Department of Pediatrics, ²Dr Shweta Sharma, Assistant Professor, Department of Pediatrics, ³Dr Rashmi Dwivedi, Professor & Head. All are affiliated with Gandhi Medical College Bhopal MP India.

Address for Correspondence: Shikha Malik Associate Professor, F1 Doctors Quarter, Hamidia Hospital Campus, Bhopal, MP, India, E-mail id: gohiyapoorva@gmail .com

Abstract

Introduction: *Helicobacter pylori* is a gram negative, spiral flagellated bacillus that persistently colonizes the human stomach. *H.pylori* incidence in most of the developing countries including India is around 80% and most of the infection is acquired by 10 years of age. In children it is associated with anaemia and undernutrition. We have taken up this study to find out its seroprevalance in undernourished children aged 6-12 years admitted in the hospital for various reasons. **Material and Methods:** This is a cross sectional study done over a period of one year in the pediatric department of a teaching hospital. After ethical committee clearance and parental consent, data was collected in a pretested proforma and serology was done for Ig G antibodies against *H.pylori* (ELISA) in which a titre of >12micrograms/ml was considered positive. **Results:** We studied 60 children who fulfilled our inclusion criteria. The male to female ratio was comparable in the different age groups, with total 29 males and 31 females. 63.3% of the children tested positive for antibodies against *H.pylori*. The seropositive children had significantly high tendency of having symptoms of *H.pylori* infection. The relation between *H.pylori* seropositivity and low BMI was significant ($p < 0.005$). 72.7% of children who regularly consumed raw vegetables were seropositive but this association was not statistically significant. Low SES and increased overcrowding index status was significantly associated with seropositivity. Low Hb as per age and sex and low PCV were associated with seropositivity. **Conclusion:** Our study showed seroprevalance of *H.pylori* to be 63.3% in undernourished children. Low SES, overcrowding, open field defecation were significantly associated with *H.pylori* infection. Low BMI, anemia and low PCV were strongly associated with *H.pylori* seropositivity. Thus we conclude that *H.pylori* contributes to morbidity of already undernourished children therefore *H.pylori* eradication regimen should be considered in undernourished children with suggestive symptoms.

Key Words: Overcrowding, Seropositivity, Anaemia, Low SES

Introduction

The acidic environment of stomach is incompatible with growth of most of the micro organisms. *Helicobacter pylori* is a gram-negative flagellate bacteria which is highly prevalent in developing countries. Its ubiquitous and infects more than half of global population [1]. *H.pylori* when initially isolated was implicated in active and chronic gastritis, peptic ulcer disease and adenocarcinoma [2]. Over the years with increasing expertise in diagnosing causal organisms for different diseases, *H.pylori* has been found to be causally related to recurrent abdominal pain, gastric mucosa associated lymphoid tissue

lymphoma, gastro esophageal reflux disease, obesity growth retardation and more recently extra gastric diseases like glaucoma, coronary heart disease and idiopathic thrombocytopenic purpura [3, 4].

H.pylori infection is acquired early in life and persists into adulthood [2]. Mode of transmission is feco-oral or oro-oral. There are lots of adult studies on role of *H.pylori* as a causative agent of different diseases. Prevalence of *H.pylori* is more in the developing countries than the developed nations. Up to 80% children in the developing world are infected under the age of 10 years. The prevalence of infection in India is

Manuscript received: 04th Feb 2016
Reviewed: 12th Feb 2016
Author Corrected: 18th Feb 2016
Accepted for Publication: 26th Feb 2016

22%,56% and 87% in 0-4,5-9 and 10-19 yearsage group respectively [5]. The diagnostic potential of direct microscopy, culture, rapidUrease test (RUT) of endoscopic antral biopsy tissues, urea breathtest and enzyme-linked immunosorbent assay (ELISA) of anti-Helicobacter pylori antibody in serum for the detection ofH. pylorihas been demonstrated [6].We have taken up this study to find out the sero prevalence of H.pylori in the undernourished children belonging to 6-12 years age group who were admitted due to various reasons.

Materials and Methods

Study Design: Prospective cross sectional study.

Study Population: Undernourished children in age group 6-12 years admitted for various etiologies in department of pediatrics of a teaching hospital.

Study Period 1 year.

Inclusion Criteria:

- Undernourished children (BMI <5th centile as per WHO charts. [7])
- Age group 6-12 years.
- Children whose parents gave consent to participate in study along with blood sample collection for serum IgG antibody (against H.pylori) assessment.

Exclusion criteria:

- Children with BMI >5th centile.
- Children with comorbidities like HIV infection, immunocompromised state, on long-term steroids, taking antibiotics for >7 days.
- Children whose parents did not give consent for sample collection for serum IgG assessment.

Institutional ethical committee approved the study. Serum collection was done at the hospital and samples were sent to Religare laboratory for serum IgG antibodies against H.pylori. IgG antibody titers of >12micrograms/ml were considered as positive.This is 77.3-78% sensitive and 91-93% specific [8].

A pretested proforma was used to collect the data of study population. The socio epidemiological factors, anthropometry, history of symptoms suggestive of H pylori infection were recorded. Complete blood picture and peripheral smear of all the subjects were sent for lab assessment.Data was processed using Microsoft Excel and SPSS 18 version. P value <0.05 was considered significant. Chi Square test and student T test were applied as test of significance.

Results

We studied 60 undernourished children who fulfilled the inclusion criteria. There were 29 males and 31 females (Table1)and 53.3% of children were in 8-10 years age group.

Table 1: Age distribution of Seronegative and seropositive children

Age in Years	Sero negative	Seropositive	Total
6	4	1	5
7-8	11	12	23
9-10	7	25	32
Total	22	38	60

Table- 2: Anthropometry and its correlation with H pylori titers

	Group Ig G Titres	N	Mean weight	Std Deviation	Std Error of mean
weight	<12	22	18.568	2.44	0.52
	>12	38	18.249	2.17	0.35
height	<12	22	120.00	7.20	1.53
	>12	38	123.19	6.79	1.1
BMI	<12	22	12.86	0.51	0.11
	>12	38	11.99	0.47	0.07

Table 3: Socioeconomic Status (SES) and Hpylori titre, Decreasing SES is significantly associated with seropositivity (p<0.05).

SES	Seronegative	Seropositive	Total
1	3(100%)	0	3
2	9(69.2%)	4(30.8%)	13
3	9(42.9%)	12(57.1%)	21
4	1(6.3%)	15(93.8%)	16
5	0	7(100%)	7
	22	38	60

Table 4: Hematological Parameters

	Group AsperIgGtitres	N	MEAN	STD. Deviation
HEMOGLOBIN	<12	22	11.150	1.5108
	>12	38	9.261	1.3114
PCV	<12	22	33.42	4.703
	>12	38	27.27	4.519
MCV	<12	22	70.486	2.5100
	>12	38	81.826	8.7372
PLT	<12	22	1.9900	.25302
	>12	38	1.55553	032890
RDW	<12	22	19.200	2.3011
	>12	38	22.916	3.7688

The sero-positivity of H pylori was 63.3%. 65.7% of sero-positive children were of 8-10 years and 55.3% of positive children were females though this difference was not statistically significant. 71% of sero-positive children had gastrointestinal symptoms suggestive of H pylori infection as opposed to 7% in the sero-negative group. This difference was statistically significant with a p value =0.003. The mean BMI of seropositive children was 11.99 and of seronegative was 12.868, this difference was statistically significant with p <0.005 (Table 2). 72% of children who consumed raw vegetables regularly i.e. for 5 days in a week, were sero-positive. We used Kuppuswamy classification to define socioeconomic status (SES) (Table 3) and 100% of children in SES 1 were sero negative whereas all were positive in SES 5, this difference was statistically significant. Mean overcrowding index of seropositive children was 2.7 as opposed to 1.6 of sero negative children, and the difference was statistically significant. Peripheral smear (Table 4) showed microcytic picture in 84% of seropositive children. Mean hemoglobin in sero-positive children was 9.2 whereas it was 11.15 in sero negative children. Mean red cell distribution width (RDW) was 22.9 in seropositive children and 19.2 in sero negative children p =0.003.

Discussion

Our study on undernourished children (BMI < 5th percentile) had shown 63.3% sero-positivity of H. pylori in 6-10 years old children. Our results are comparable to other Indian studies [9,10]. Studies focused on asymptomatic children [11,12] had shown sero-positivity between 23%-38%. The sero-positivity in other developing countries is strikingly low [13,14]. As our study was done on undernourished hospitalized

children, we had a high sero positivity which suggests that undernourished children should be evaluated for H pylori infection. H pylori sero-positivity had no sex difference in our study which is in accordance to other studies [15,16,17].

Upper gastrointestinal symptoms, recurrent abdominal pain, dyspepsia all are said to be associated with H.pylori. This assumption has been supported by some studies done in developing countries

[18,19,20,21,22]. Our study has also found statistically significant ($p=0.003$) association of symptoms of upper GI discomfort, dyspepsia and recurrent abdominal pain to be associated with H pylori sero-positivity. This observation should be considered in management of undernourished children with recurrent abdominal pain. The mean BMI of seropositive children was 11.99, which is less than 5th centile, as well as significantly ($p<0.005$) low as compared to seronegative children. This observation suggests that H. pylori infection further compromises the already undernourished state of children. Therefore undernourished children management guidelines should also incorporate eradication of H pylori from stomach. The proportion of undernourished children belonging to lower socioeconomic status was sero-positive for H pylori whereas upper class children even when undernourished were seronegative. This association of socioeconomic status with sero-positivity is significant, which is corroborated in other studies done in developing countries [23,15]. Our study found significant relation of overcrowding with H pylori sero-positivity. The mean overcrowding index was 2.7 in seropositive children. This relation of overcrowding with seroprevalence is significant as our study had undernourished children only. The factors, which contribute to prevalence of undernourishment, were present in both sero-positive and sero-negative group therefore the association of overcrowding with H pylori sero-positivity can't be associated with malnutrition only. Study from in Bangladesh [21] compared malnourished and non-malnourished children have concluded that factors contributing to malnourishment are also associated with H. pylori seroprevalence. Hematological parameters, which we studied, were hemoglobin levels, RDW and peripheral smear. The mean Hemoglobin was significantly less in undernourished children who were seropositive as compared to seronegative children. The association of anemia with H pylori has been well established in various studies and is attributed to, mal-absorption of iron because of increase in gastric pH and interference in ascorbic acid secretion [24].

Conclusion

We conclude that H pylori infection in already undernourished children further compromises their nutritional status and hematological parameters. As ours is a hospital based study the results can not be extrapolated for community but this can help in planning larger community based studies so as to make policy which will incorporate the regimen for H pylori

eradication in the management of undernourished children who present with gastrointestinal symptoms.

Funding: Nil, **Conflict of Interest:** None

Permission of IRB: Yes

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How to cite this article?

Malik S, Sharma S, Dwivedi R, Seroprevalence of *Helicobacter pylori* in undernourished children: A hospital based study : *Iraq: Int J Pediatr Res* 2016;3(3):151-155. doi:10.17511/ijpr.2016.i03.03.

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