Open Access

Original Article

Frequency of *Helicobacter pylori* Infection in Symptomatic Patients of a Tertiary Care Hospital

Sehrish Javed, Tariq Ghafoor*, Shabbir Hussain, Farooq Ikram, Sidra Tanveer

Department of Pediatric, Pak Emirates Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Department of Pediatric, Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To determine the frequency of *Helicobacter pylori* infection in symptomatic patients attending pediatric department of Pak Emirates Military Hospital, Rawalpindi Pakistan.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Pediatric Medicine Department, Pak Emirates Military Hospital, Rawalpindi Pakistan, from Nov 2018 to Oct 2019.

Methodology: Children 2-5 years of age of either gender were included through non probability consecutive sampling. History and complete clinical examination were performed whereas stool testing method was used to diagnose *Helicobacter pylori* infection. The presence of *helicobacter pylori* infection along with the predictor variables were observed.

Results: Of 164 children, the mean age of the children was 3.76±1.01 years. The frequency of *Helicobacter pylori* infection was 55(33.54%). The odds of *Helicobacter pylori* infection was 5.89 times considerably higher among patients with rural residence (AOR: 5.89,95% CI: 2.15-16.19), 9.79 times significantly higher among patients with abdominal pain (AOR: 9.79,95% CI: 2.24-42.89), 8.74 times significantly higher among patients with lack of appetite (OR: 8.74,95% CI: 2.41-31.75), while 88% significantly lower odds of *Helicobacter pylori* infection was found among children who used filter water (AOR: 0.12, 95% CI: 0.02-0.95).

Conclusion: *Helicobacter pylori* infection was found in considerable number of symptomatic children in our cohort. A thorough understanding of *Helicobacter pylori's* characteristics and potential risk factors would be important in child management strategies.

Keywords: *Helicobacter-pylori* infection, Pakistan, Risk factors, Symptomatic children.

How to Cite This Article: *Javed S, Ghafoor T, Hussain S, Ikram F, Tanveer S. Frequency of Helicobacter pylori Infection in Symptomatic Patients of a Tertiary Care Hospital. Pak Armed Forces Med J 2023; 73(Suppl-1): S209-212. https://doi.org/10.51253/pafmj.v73iSUPPL-1.3726.*

INTRODUCTION

Helicobacter pylori (H. Pylori) infection is a global problem and means a wide range of differences across the globe.[1,2] *H. pylori* is a gram-negative-bacteria with strong links to gastrointestinal problems, such as peptic ulcers and malignant conditions.[3] Although, the exact mode of transmission of *H. pylori* is still debatable. Studies have reported gastro/oral, faeco/oral, and/oro/oral modes of transmission as the most likely cause of *H. pylori* infection. Moreover, interfamilial or intergenerational transmission is also reported in previous studies.[4,5]

Around 1/3rd of the world's population is reported to be infected with *helicobacter pylori* infection in published studies. In addition, a positive correlation of *H. pylori* infection reported with the increase in age.[6] Studies also revealed that individuals in low and middle income countries are significantly affected relative to individuals in developed countries.[3] Researchers have recorded a 3-10% incidence of *H. pylori* in developing countries compared to 0.5% in developed countries.[6]

Correspondence: Dr Sehrish Javed, House No. 456, Street No. 08 G-11/1, Islamabad Pakistan

Received: 11 Jan 2020; revision received: 17 Apr 2020; accepted: 12 May 2020

Despite the large number of studies published both nationally and internationally on the epidemiology of *H. pylori*, continuous monitoring of current understanding of the topic is desperately needed. It is highly necessary to research both clinical and non-clinical factors that contribute to the prevalence of *H. pylori*. The aim of the current study was to determine the burden of *H. pylori* infection in symptomatic children. Finding from this study will provide the basis for estimating the frequency and magnitude of infection by *H. pylori* in our population so that better understanding and adequate management of the disease can be offered.

METHODOLOGY

The cross-sectional analytical study was performed at the Paediatric Medicine Department of Pak Emirates Military Hospital, Rawalpindi Pakistan, from November 2018 to October 2019.

Inclusion Criteria: All children aged 2-5 years of either gender having complaint of abdominal pain or vomiting were included.

Exclusion Criteria: Children treated with antibiotics during last four weeks or signs of any active viral or bacterial infections were excluded.

Epi info sample size calculator was used for the estimation of sample size taking confidence interval 95%, margin of error 6%, *H. pylori* in children having 3-5 years 19%.[7] Sample size came out to be 164.

An informed consent was taken by parents or guardian of each child. History and complete clinical examination were performed by trainee researcher and stool samples were analyzed in laboratory of this hospital for H. pylori(Antigen) by ELISA and the result was verified by pathologist. The status of *H. pylori* status along with predicting factors including age, sex, history of *H. pylori* in mother, maternal education status, residence, and the type of drinking water used were recorded. Furthermore, clinical characteristics like abdominal pain, vomiting and lack of appetite was also noted. Mother who was unable to read and write was considered as illiterate. Approval from the ethical committee was obtained prior conduction of the study (EC#: A/28/EC/55/19).

Statistical analysis was performed using SPSS version 22. Mean with the standard deviation (SD) were explored for age whereas qualitative variables were explored using frequency and percentages. Comparison was done to see the association of *H. pylori* infection with age, gender, residence, *H. pylori* infection in mother, maternal education status, and type of drinking water used. Chi-square test was applied. *p*-value≤0.05 taken as significant. Inferential statistics were also explored using binary logistic regression. Univariate and multivariate analysis were applied.

RESULTS

Of 164 children, mean age was 3.76±1.01 years. There were 70(42.7%) children with ≤3.5 years of age and 94(57.3%) children with >3.5 years of age. Most of the children were males 111(67.7%) whereas 53(32.3%) were females. Urban residence was found in 106 (64.6%), history of *H. pylori* infection in mother in 51 (31.3%), and maternal illiteracy in 30(18.3%) children.

The clinical characteristics showed that abdominal pain was reported in 92(56.1%), vomiting in 83(50.6%), and lack of appetite in 40(24.4%) children. There were 134(81.7%) children who used boil drinking water, 17(10.4%) children who used tap water, and 13(7.9%) used filter water.

The frequency of *H. pylori* infection was found in 55(33.54%) children. A statistically significant association of *H. pylori* infection was found with age of the patients (*p*:<0.001), residence (*p*:<0.001), history of *H. pylori* infection in mother (*p*:<0.001), mother's education level (*p*:<0.011), abdominal pain (*p*:<0.007), lack of appetite (*p*:<0.001), and drinking water (*p*:<0.003). (Table-I)

Table-I: Comparison of *H. pylori* infection with respect to general characteristics of the patients (n=164)

Variables	Total	*H. Pylori*		*p*-value
		Positive	Negative	
		n=55	n=109	
	n (%)	n(%)	n(%)	
Age, years	3.76±1.01	4.25±0.79	3.53±1.01	
≤3.5	70(42.7)	12(17.1)	58(82.9)	<0.001**
>3.5	94(57.3)	43(45.7)	51(54.3)	
Gender				
Male	111(67.7)	40(36.0)	71(64.0)	0.327
Female	53(32.3)	15(28.3)	38(71.7)	
Residence				
Urban	106(64.6)	17(16.0)	89(84.0)	<0.001**
Rural	58(35.4)	38(65.5)	20(34.5)	
H.Pylori infected mother				
Yes	51(31.1)	31(60.8)	20(39.2)	<0.001**
No	113(68.9)	24(21.2)	89(78.8)	
Mother's education level				
Literate	134(81.7)	39(29.1)	95(70.9)	0.011*
Illiterate	30(18.3)	16(53.3)	14(46.7)	
Clinical characteristics				
Abdominal pain	92(56.1)	39(42.4)	53(576)	0.007*
Vomiting	83(50.6)	26(31.3)	57(68.7)	0.544
Lack of appetite	40(24.4)	24(60.0)	16(40.0)	<0.001**
Drinking water				
Filter water	13(7.9)	4(30.8)	9(69.2)	0.003*
Boil water	134(81.7)	39(29.1)	95(70.9)	
Tap water	17(10.4)	12(70.6)	5(29.4)	

Chi-square test applied, p-value <0.05 taken as significant
***p-value <0.005, *p-value <0.05*

The univariate analysis showed that the odds of *H. pylori* infection was 4.07 times significantly higher among patients having >3.5 years of age (OR: 4.07,95% CI: 1.94-8.56), 9.94 times higher among patients with rural residence (OR: 9.94,95% CI: 4.69-21.05), 5.74 times higher among patients with *H. pylori* infected mother (OR: 5.74,95% CI: 2.79-11.82), 2.78 times higher among patients with illiterate mother's education level (OR: 2.78,95% CI: 1.24-6.25), 2.57 times higher among patients with abdominal pain (OR: 2.57,95% CI: 1.28-5.14), 4.51 times higher among patients with lack of appetite (OR: 4.51,95% CI: 2.12-9.54). Whereas 0.8 times lower odds of *H. pylori* infection were found among children who used filtered water (OR: 0.19,95% CI: 0.04-0.89) and 0.83 times lower infection among patients who drink boil water (OR: 0.17,95% CI: 0.06-0.52) as compared to tap water. The findings of multivariable analysis showed that after adjusting for all other co-variates, in

patients with rural residence the likelihood of *H. pylori* infection was 5.89 times significantly higher (AOR: 5.89,95% CI: 2.15-16.19), in patients with abdominal pain 9.79 times significantly higher (AOR: 9.79,95% CI: 2.24-42.89), in patients with lack of appetite 8.74 times significantly higher (OR: 8.74,95% CI: 2.41-31.75), while 88% times significantly lower among patients with *H. pylori* infection was found among children who used filter water (AOR: 0.12,95% CI: 0.02-0.95). (Table-II)

Table-II: Regression analysis of variables associated with H.Pylori infection (n=164)

	Univariate analysis		Multivariable analysis	
	OR (95% CI)	***p*-value**	**AOR (95% CI)**	***p*-value**
Age, years				
>3.5	4.07 (1.94-8.56)	<0.001	2.08 (0.72-5.96)	0.174
≤3.5	Ref		Ref	
Residence				
Rural	9.94 (4.69-21.05)	<0.001	5.89 (2.15-16.19)	<0.001
Urban	Ref		Ref	
***H. pylori* infected mother**				
Yes	5.74 (2.79-11.82)	<0.001	2.67 (0.98-7.23)	0.054
No	Ref		Ref	
Mother's education level				
Illiterate	2.78 (1.24-6.25)	0.013	3.03 (0.68-13.51)	0.145
Literate	Ref		Ref	
Abdominal Pain				
Yes	2.57 (1.28-5.14)	0.007	9.79 (2.24-42.89)	0.002
No	ref		ref	
Lack of Appetite				
Yes	4.51 (2.12-9.54)	<0.001	8.74 (2.41-31.75)	0.001
No	Ref		Ref	
Drinking Water				
Filter water	0.19 (0.04-0.89)	0.036	0.12 (0.02-0.95)	0.044
Boil water	0.17 (0.06-0.52)	0.002	0.46 (0.11-1.95)	0.289
Tap water	Ref		Ref	

DISCUISSION

The current prospective analytical study was conducted with *H. pylori* in one of the highly epidemic countries. This study has found that 33.54% of children suffered from *H. pylori* infection. This prevalence is remarkable lower as compared to a previous study by Javed *et al.* in 2010 from Pakistan in which the prevalence is reported as 92%.[8] Similarly, a study conducted on infants of Karachi has reported prevalence of 79%.[9] Another study conducted from Aga khan University Karachi in children aged 11-15 years reported 53.5% prevalence.[10] A school-based population of Islamabad without gastrointestinal problem has also approximately 72% prevalence.[11] The lower frequency in current study is indicating the improving situation of H. infection in our population. However, the finding of the current cannot be generalized on slum or relatively lower socioeconomic or educated areas of Pakistan as the current study was conducted in paediatric medicine department of Pak Emirates Military Hospital, Rawalpindi which deals majority of the patients with good hygienic practice, environmental condition, and literacy. However, still the frequency is higher when compared with a developed country Italy in which the prevalence is reported as lower as 3%.[12]

According to the current study finding, the odds of infection was 5.89 times considerably higher in individuals who lived in rural residence as compared to the patients with urban residence. These finding were contrast with the findings of studies by Awuku *et al*. in Africa and Toscano *et al*. in Brazil.[13,14] However, similar to our study findings, a marked differences was reported in prevalence in different strata of the United States and the prevalence was reported as approximately twice as high among blacks and Hispanics as compared to whites.[14-16]

The odds of *H. pylori* infection was found to be 88% lower among children who used filter water as compared to children who used tap water. Similar findings were reported in previous studies as well by Aziz *et al.* and Wangda et al as.[17,18]

Similar to various previous studies,[19-21] the current study has also used stool antigen testing method for the determination of the infection. However, literature has also reported various other methods like serologic testing,[10,22,23] carbon-13 urea breath testing,[8,24] or urine antigen testing,[25] as well.

As bacterial populations evolve quickly and can spread rapidly to people of different ethnicities. Studies are being conducted to study the genome sequence of *H. pylori* infection. However, in the current paper we have not studied the genome sequence of *H. pylori* infection. Moreover, studies are also being conducted to assess the virulence factors and its association with the clinical outcomes. Thus, future epidemiological studies are also recommended to focus on these factors as well.

CONCLUSION

H. pylori infection was found in considerable number of symptomatic children in our cohort. A thorough underst-

anding of H. pylori's characteristics and potential risk factors would be effective in child management strategies.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

SJ & TG: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

SH & FI & ST: Conception, study design, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Zamani M, Ebrahimtabar F, Zamani V, Miller WH, Alizadeh-Navaei R, Shokri-Shirvani J, et al. Systematic review with meta-analysis: the worldwide prevalence of *Helicobacter pylori* infection. Alimentary pharmacology & therapeutics 2018; 47(7): 868-876. https://doi.org/10.1111/apt.14561.
2. Hassan MN, Arif A, Shahzad MS, Ibrahim M, Rahman HA, Razaq MA, et al. Global prevalence of *helicobacter pylori* and its effect on human health. Pure and Applied Biology 2020; 9(1): 936-48. http://dx.doi.org/10.19045/bspab.2020.90098.
3. Burucoa C, Axon A. Epidemiology of *helicobacter pylori* infection. Helicobacter 2017; 22: e12403.
4. Lakhiar JA, Khan MA, Akash A, Imran M, Raza MH. Helicobacter pylori: A clinical review. Helicobacter 2018; 47.
5. Ueno T, Suzuki H, Hirose M, Shida T, Ikezawa K, Matsui H, et al. Influence of Living Environment during Childhood on *Helicobacter pylori* Infection in Japanese Young Adults. Digestion 2019: 24:1-6. https://doi.org/10.1159/000502574.
6. Rosenberg JJ. Helicobacter pylori. *Pediatr Rev* 2010: 31(2): 85-86.
7. Chobot A, Porębska J, Krzywicka A, Żabka A, Bąk-Drabik K, Pieniążek W, et al. No association between *Helicobacter pylori* infection and gastrointestinal complaints in a large cohort of symptomatic children. Acta Paediatrica 2019; 108(8): 1535-1540. https://doi: 10.1111/apa.14721.
8. Javed M, Amin K, Muhammad D, Husain A, Mahmood N. Prevalence of H. Pylori. Professional Med J 2010; 17(3): 431-439.
9. Nizami SQ, Bhutta ZA, Weaver L, Preston T. *Helicobacter pylori* colonization in infants in a periurban community in Karachi, Pakistan. journal of pediatric gastroenterology and nutrition 2005; 41(2): 191-194.
10. Jafri W, Yakoob J, Abid S, Siddiqui S, Awan S, Nizami SQ. *Helicobacter pylori* infection in children: population-based age-specific prevalence and risk factors in a developing country. Acta Paediatrica 2010; 99(2): 279-282.
11. Ahmad TA, Bilal RA, Khanum AZ. Prevalence of *Helicobacter pylori* infection in asymptomatic children of Islamabad suburbs (Pakistan). Int J Agri Biol 2008; 10: 685-688.
12. Baldassarre ME, Monno R, Laforgia N, Fumarola L, Fanelli M, Sgobba C, et al. The source of *Helicobacter pylori* infection in the neonatal period. J Perinat Med 2009; 37(3):288-292.
13. Awuku YA, Simpong DL, Alhassan IK, Tuoyire DA, Afaa T, Adu P. Prevalence of *helicobacter pylori* infection among children living in a rural setting in Sub-Saharan Africa. BMC public health 2017; 17(1): 360. https://doi: 10.1186/s12889-017-4274-z.
14. Toscano EP, Madeira FF, Dutra-Rulli MP, Gonçalves LO, Proença MA, Borghi VS, et al. Epidemiological and clinical-pathological aspects of *Helicobacter pylori* infection in brazilian children and adults. Gastroenterology research and practice 2018; 1-8.
15. Everhart JE, Kruszon-Moran D, Perez-Perez GI, Tralka TS, Mc Quillan G. Seroprevalence and ethnic differences in *Helicobacter pylori* infection among adults in the United States. The Journal of infectious diseases 2000; 181(4): 1359-1363.
16. Hooi JK, Lai WY, Ng WK, Suen MM, Underwood FE, Tanyingoh D et al. Global prevalence of *Helicobacter pylori* infection: systematic review and meta-analysis. Gastroenterolo 2017; 153(2): 420-429. https://doi: 10.1053/j.gastro.2017.04.022.
17. Aziz RK, Khalifa MM, Sharaf RR. Contaminated water as a source of *Helicobacter pylori* infection: A review. J. Adv. Res 2015; 6(4): 539-547.
18. Wangda S, Richter JM, Kuenzang P, Wangchuk K, Choden T, Tenzin K, et al. Epidemiology of *Helicobacter pylori* infection in asymptomatic schoolchildren in Bhutan. Helicobacter 2017; 22(6): e12439. https://doi: 10.1111/hel.12439.
19. Kori M, Goldstein E, Granot E. *Helicobacter pylori* infection in young children detected by a monoclonal stool antigen immunoassay. Pediatr Infect Dis J 2009; 28(2): 157-159.
20. Sykora J, Siala K, Varvarovska J, Pazdiora P, Pomahacova R, Huml M, et al. Epidemiology of *Helicobacter pylori* infection in asymptomatic children: a prospective population-based study from the Czech Republic. Application of a monoclonal-based antigen-in stool enzyme immunoassay. Helicobacter 2009; 14(4): 286-297.
21. Yucel O, Sayan A, Yildiz M. The factors associated with asymptomatic carriage of *Helicobacter pylori* in children and their mothers living in three socio-economic settings. Jpn J Infect Dis 2009; 62(2): 120-124.
22. Arslan E, Atilgan H, Yavasoglu I. The prevalence of *Helicobacter pylori* in obese subjects. Eur J Intern Med 2009; 20: 695-697.
23. Mansour KB, Keita A, Zribi M, Masmoudi A, Zarrouk S, Labbene M, et al. Seroprevalence of *Helicobacter pylori* among tunisian blood donors (outpatients), symptomatic patients and control subjects. Gastroenterol Clin Biol 2010; 34(1) :75-82.
24. Mohammad MA, Hussein L, Coward A, Jackson SJ. Prevalence of *Helicobacter pylori* infection among Egyptian children: impact of social background and effect on growth. Public Health Nutr 2008; 11(3): 230-236.
25. Naito Y, Shimizu T, Haruna H, Fujii T, Kudo T, Shoji H, et al. Changes in the presence of urine *Helicobacter pylori* antibody in japanese children in three different age groups. Pediatr Int 2008; 50(3): 291-294.