



## ASSOCIATION OF *HELICOBACTER PYLORI* INFECTION AND GASTROINTESTINAL DISEASE IN CHILDREN

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### ABSTRACT:

**Purpose:** The purpose of this study was to assess the association between some clinical and epidemiological factors and the prevalence of *Helicobacter Pylori* (*H. pylori*) infection in children visited a paediatrics ambulatory care at University Hospital - Pleven for various symptoms pointing to gastritis and peptic ulcer.

**Materials and methods:** an epidemiological study was conducted for the period June-September 2023. In total, 133 children aged from 2 to 18 years were evaluated. All visited a paediatrics ambulatory care at University Hospital - Pleven for various complaints pointing to gastritis and peptic ulcer.

**Results:** During the study period, we recruited a total of 133 children and adolescents (age range 2-18 years, mean age  $9.36 \pm 4.08$  years). More patients were males (54.14%) than females (45.86%). The most frequent symptoms were abdominal pain (51.88%), nausea and vomiting (21.80%), and losing weight (10.53%). The social status of the families is good - parents with a university education predominate (49.62%). There are risk factors for the presence of infection and the development of gastritis and ulcers in children: family history of *H. pylori* infection (47.37%) and use of unsuitable foods (48.87%). A high positivity is found for *H. pylori* (40.43%).

**Conclusions:** Early diagnosis and etiological treatment of *H. pylori* infection reduces the risk of developing gastric complications like chronic gastritis, ulcer diseases and gastric cancer.

**Keywords:** *H. pylori*, children, gastritis, peptic ulcer,

### INTRODUCTION:

Diseases of the digestive system, such as gastritis or peptic ulcer, are common in children and adolescents and occupy an important place in paediatric pathology due to their early onset, chronic course and often latent course. Early diagnosis and timely treatment are essential in determining the health status of children [1, 2].

A particular problem requiring special investigation is *Helicobacter pylori* (*H. pylori*) infection and related pathology in children and adolescents. Infection is thought to occur mainly in childhood, and the family is the main source of infection. It occurs mainly in children living in developing countries or living in poor socio-economic conditions [3]. *Helicobacter pylori* is a common cause of peptic ulcer disease in children, and chronic infection is thought to be associated with an anaemia syndrome [4, 5, 6].

A possibility for research and detection of *H. pylori* are non-invasive tests, one of which is the study of antigens of the causative agent in faecal samples. The test is suitable for patients with symptoms of ulcer or gastritis, as well as for screening in families of persons positive for *H. pylori*, and if a carrier is suspected [7].

Treatment of the infection aims to eliminate the *H. pylori* bacterium and prevent further damage to the gastric mucosa. Curing the ulcer disease will also prevent the progression of the disease and its complications. In the presence of stomach complaints, an examination for the presence of *H. pylori* and its cure is appropriate [8, 9].

The purpose of this study was to assess the association between some clinical and epidemiological factors and the prevalence of *H. pylori* infection in children.

### MATERIALS AND METHODS:

A prospective epidemiological study was conducted for the period June-September 2023. In total, 133 children aged from 2 to 18 years were evaluated. All vis-

ited a paediatrics ambulatory care at University Hospital - Pleven for various symptoms pointing to gastritis and peptic ulcer. The children were divided into four age groups: Preschool education (2-5 years of age) and School education: Elementary education (6-10 years of age), Secondary education (11-14 years of age) and Higher education (15-18 years of age). Thirty-two children who visited the pediatrics ambulatory for preventive examinations participated in the study as a control group. A sociological method of data collection (interview) was used, and a questionnaire was developed to collect data on the demographic and social characteristics of the subjects. Documentary method /medical documents/ for gathering data on the health status of children. Permission was obtained from the Research Ethics Committee (Protocol 1 729). Informed consent was obtained from the participants. The studied children undertake a clinical examination / detailed history taking and physical examination/. Laboratory and imaging tests were performed: an ultrasound examination of abdominal organs and an X-ray examination of the stomach with Barium Sulfate Slurry were performed. Faeces were taken from the children with symptoms and the control group, and the Helicobacter pylori antigen test (analysed by an immunological chromatographic method) was applied. Statistical analysis using MS Excel and Statgraphics Centurion 19 to analyze collected data. Significance levels were set at "p" less than 0.05.

The study was carried out under Project No. 2/ 2023, financed by Medical University-Pleven.

### RESULTS:

During the study period, we recruited a total of 133 children and adolescents (age range 2-18 years, mean age  $9.36 \pm 4.08$  years). The distribution by age groups and sex is as follows in Table 1. Children aged 6-10 years have the highest relative share – 42.11%, followed by the age group 11-14 years – 22.56%. The distribution by gender in all age groups is close to even – male 72 (54.14%) and female 61 (45.86%), respectively. The male/female ratio was  $>1$  in all age groups. The studied families mostly live in cities - 93 (69.62%) and less often in villages – 40 (30.08%).

**Table 1.** Age and sex distribution, and male/female ratio of the patients.

Age (years)	All patients N (%)	Male N (%)	Female N (%)	M/F ratio
	133	72 (54.14)	61 (45.86)	1.18
2-5	26 (21.05)	13 (46.43)	15 (53.57)	1.15
6-10	56 (42.11)	34 (60.71)	22 (39.29)	1.54
11-14	30 (22.56)	14 (46.67)	16 (53.33)	1.14
15-18	19 (14.28)	11 (57.89)	8 (42.11)	1.37

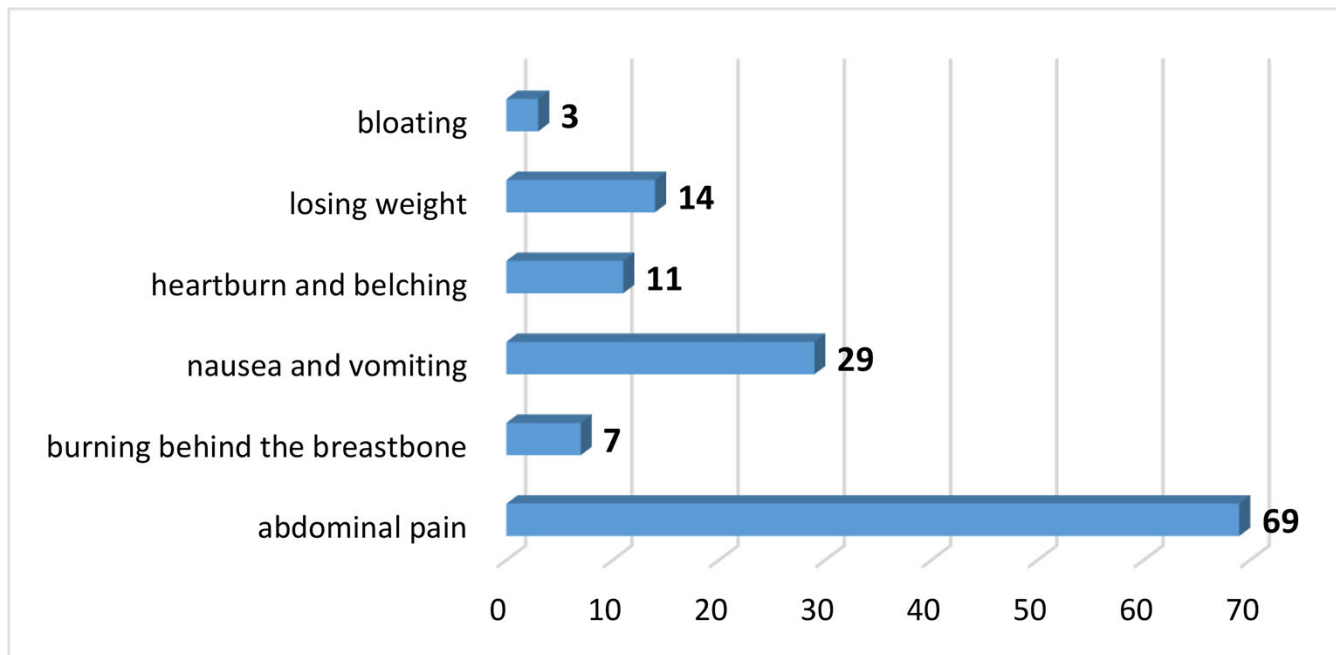
Demographics data and family anamnesis for *H. pylori* infection are presented in Table 2.

**Table 2.** Demographics data and family history for *H. pylori* infection of the studied population.

Indicator	Number (n)	Percentage (%)
<b>Mother's Education:</b>		
- University education	66	49.62
- Higher school education	52	39.1
- Secondary school education	7	5.26
- Elementary school education	5	3.76
- Without education	3	2.26
<b>Father's education:</b>		
- University education	66	49.62
- Higher school education	54	40.6
- Secondary school education	3	2.26
- Elementary school education	6	4.51
- Without education	3	2.26
<b>Ethnic origin:</b>		
- Bulgarians	92	69.17
- Turks	17	12.78
- Romani	24	18.05
<b>Presence of chronic gastrointestinal disease among family members:</b>		
- No	70	52.63
- Mother	25	18.8
- Father	11	8.27
- Brother/sister	7	5.26
- Grandma/grandpa	11	8.27
- More than one	9	6.77
<b>Proven <i>H. pylori</i> infection in family members?</b>		
- Yes	42	31.58
- No	91	68.42
<b>Held treatment of <i>H. pylori</i>:</b>		
- No	95	71.43
- Probiotics, proton pump inhibitors	27	20.3
- Antibiotics	11	8.27

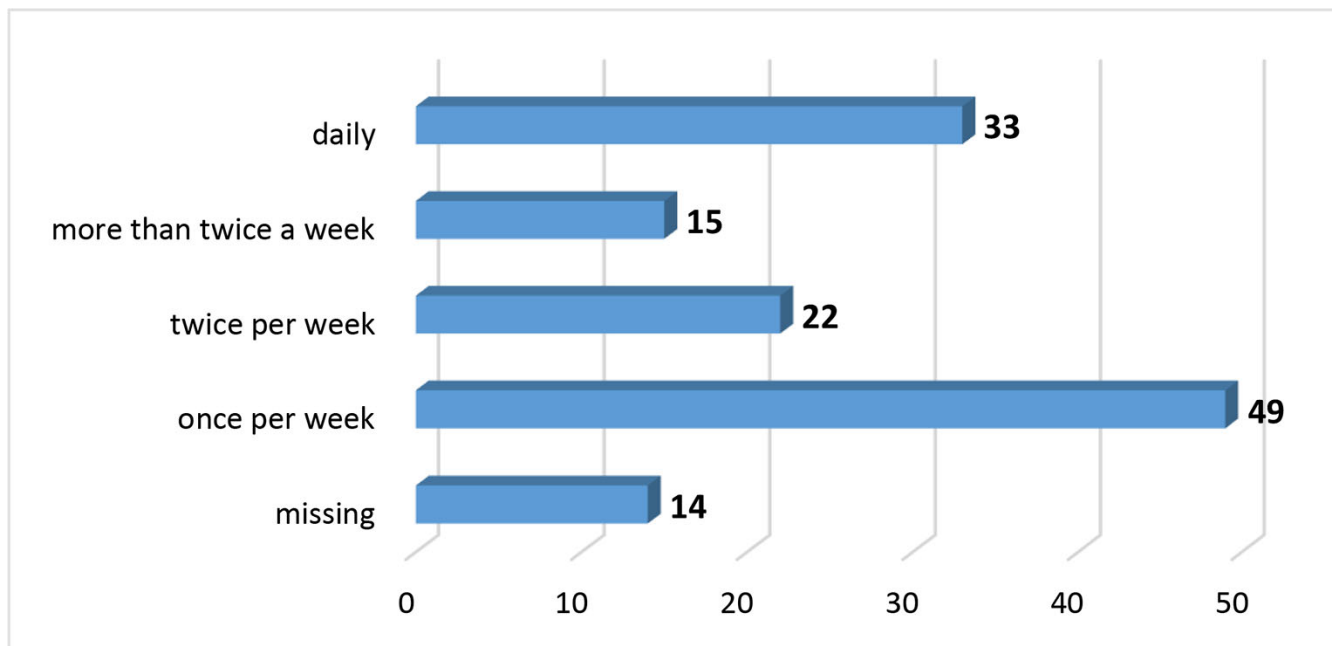
The first complaints are registered at different ages: from 2 to 17 years, on average at 8 years,  $sd \pm 4.028$ . The main symptoms reason for visiting a doctor are shown in Figure 1.

**Fig. 1.** The most common symptoms in the study population.



As can be seen from the figure, the leading symptom was abdominal pain. When asked how often this symptom affects the child's daily life, the following answers were received (Figure 2):

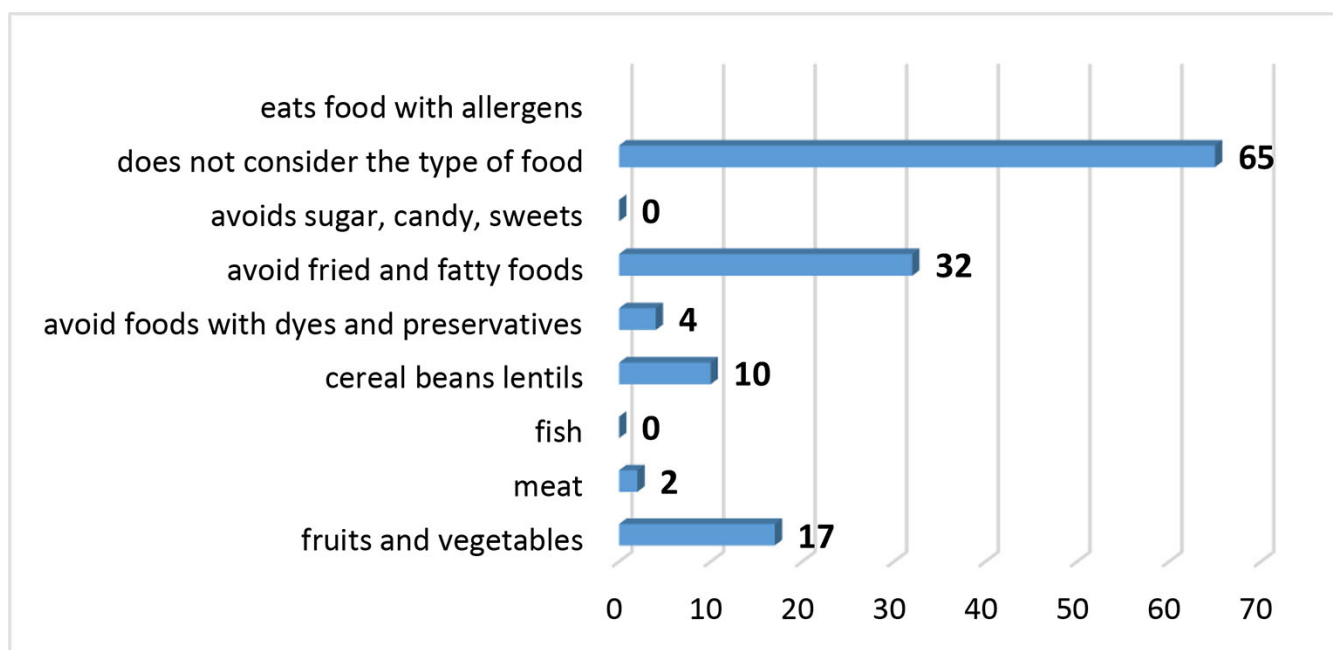
**Fig. 2.** Frequency (per week) of abdominal pain.



The parents reported a varying degree of anxiety - in 84 (63.16%) children, as well as a sleep problem in 50 (37,595).

The intake of predominant food products among children is shown in Figure 3:

**Fig. 3.** Nutrition of the study population.



Test for *H. pylori* was performed on 47 children from the study group, 19 (40.43%) of them were positive. Prevalence of infection among different age groups was as follows: 2-5 years (2/11), 18,18%; 6-10 years (9/19), 47,36%; 11-14 years (5/11), 45,45%; 15-18 years (3/6), 50%.

As a result of the clinical, epidemiological, laboratory and instrumental methods of research, a final diagnosis of gastritis was made in 112 (84.21%) children and peptic ulcer disease in 21 (15.79%). The testing of the children from the control group found 7 children to be asymptomatic carriers of *H. pylori*. No statistically significant correlation was found between a family history of gastric disease and *H. pylori* infection in children (depending on Analysis of Variance – F-Eatio 0.02 and p-value 0.8759).

#### DISCUSSION:

In the presented prospective study, we analyzed the association between some clinical and epidemiological factors and the prevalence of *H. pylori* infection in children. The age of prevalence is well documented in *H. pylori* epidemiology, and there is a positive correlation between age and prevalence. Our study showed a higher prevalence in the age groups 6-10 and 11-14 years (study population and control group). The mean age of the children in the study was  $9.36 \pm 4.08$  years, as reported in other publications. Also, the results show equal involvement in both sexes - male and female. Our results are consistent with data from other studies confirming that school age children are the most affected in terms of gastrointestinal symptoms. Our results, as well as data from other authors, show that the leading symptom in children

was abdominal pain. It was assumed that after the start of school, the insufficient control of personal hygiene, as well as hygiene in schools, increases the risk of infection and transmission of the infection from person to person. In the family environment, spread was possible in the presence of an infected person, with close contacts, most often from mother to child [10, 11]. We hypothesize that a leading cause of child abandonment was the presence of a source of infection, possibly a parent. Our study was used for qualitative examination of *H. pylori* antigen in stool because of its non-invasive nature, especially in children.

We would recommend – in the case of an established etiologically proven case of *H. pylori* infection, the whole should be tested and treated. As a part of complex measures to reduce the risk of complications in children with chronic gastritis and peptic ulcer, it is necessary to reduce stress, as well as the intake of unhealthy foods.

#### CONCLUSION:

Our study and analysis show the need for early diagnosis and timely etiological treatment of *H. pylori* infection in children. This would reduce the risk of developing stomach complications such as chronic gastritis, ulcer disease and stomach cancer at a later age. The study of *H. pylori* antigen in faeces is suitable for screening of risk groups and should be applied as a preventive measure to reduce the spread of infection in childhood.

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