Differences of Characteristics between Positive and Negative Helicobacter Pylori Infection in Children with Recurrent Abdominal Pain

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Abstract: Background: Recurrent abdominal pain (RAP) is a common problem among children. Currently Helicobacter pylori infection (H. pylori) is one of the largest organic causes in children with RAP. Several studies reported the diversity of factors that affect H. pylori infection in children all over the world. Objective: Thus our study aimed to reveal the difference of characteristics between H. pylori positive and negative infection in RAP children. Methods: A cross-sectional study was conducted on junior high and senior high school students in Bandung who presenting RAP in August to September 2017. Infection of H. pylori was defined by positive IgG antibodies. Analysis of characteristic differences between positive and negative H. pylori infection using chi square test and p value <0.05 was statistically considered significant. Results: Out of 99 students presenting with RAP were included in the study. Helicobacter pylori seropositivity was found in 45 subject. The proportion of RAP was 13.5% and the proportion of H. pylori infection in students with RAP was 45.4%. H. pylori was positive in 29 senior high school and 16 junior high school students. There was significantly difference in age group with p value=0.011 (p<0.05) but there was no difference in gender, mother educational, family income, family history of RAP and hygienity level between positive and negative H. pylori infection in children with RAP (p=0.339, 0.509, 0.815, 0.255, 1.000, respectively). Conclusions: There was significant difference in age group, while gender, mother education, family income, family history of RAP and hygienity level had no difference.

Keywords: Recurrent abdominal pain, Helicobacter pylori, characteristic, children

1. Introduction

Recurrent abdominal pain (RAP) is a common problem in children and adolescence population worldwide [1-4]. Recurrent abdominal pain may responsible for 2 to 4% of pediatric outpatient clinic [5]. Many researchers had shown an association between Helicobacter pylori (H. pylori) infection and RAP [6]. The frequency of H. pylori infection in RAP children from various studies in China, Pakistan, Saudi Arabia, Egypt and Indonesia ranged from 18.6% to 91% [7-13].

Helicobacter pylori infection is a major cause of various gastroduodenal disorders such as peptic ulcer, duodenal ulcer, adenocarcinoma of gastric and mucosa associated lymphoid tissue lymphoma (MALT lymphoma) in adulthood and autoimmune gastritis [14-16].

Some studies reported various related factors with H. pylori infection. Age have been associated with increasing age [17,21]. Socioeconomic factors have been associated with H. pylori infection [17-20] including family income level [10,21,22], associated with mother education level [17,23,24], associated with family history of H. pylori infection [9,21] and associated with hygienity [25]. Other studies showed no association between H. pylori infection with age [10], gender [10,18,19,21] family income levels [26,22], mother education level [18,25,27], family history of H. pylori infection [18,25,27] and no association with hygienity [27]. There are differences in research results of the factors that affect H. pylori infection in children all over the world [28].

So our study aimed to determine differences of age group, gender, maternal education level, family income level, family history of RAP and level of hygiene between positive and negative H. pylori infection in children who experienced RAP.

2. Methods

A cross sectional study in children with RAP was held in junior high school 10 and high school 23 in Bandung Indonesia from August to September 2017. This study was approved by the Ethical Committee of Faculty of Medicine Padjadjaran University. The subjects of this study met the inclusion criteria’s i.e. the age ranged from 12 to 18 years old, had symptoms of RAP, and the parents agreed their children to participated in this study. Exclusion criteria were children who didn’t come during blood sample taking. The parents who fulfilled the inclusion criteria filled the informed consent, and to be examined the serum anti H. pylori IgG using BioM pylori kit (local antigen of Mataram) that had a sensitivity of 95% and specificity of 92%. [29] The result from the examination was divided into two groups, positive and negative H. pylori group. The characteristic data of both groups were recorded. Recurrent abdominal pain was defined as at least three separate episodes of abdominal pain that occurred in a 3-month period, severe enough to affect daily activities. The H. pylori infection was positive if serum IgG was positive. Mother education status were defined as low (graduated junior high school), moderate (graduated from senior high school) and high (graduated from university or more). Family monthly income were classified as low, moderate and high. Family history of RAP was answered by yes or no. Standard of hygiene conditions using
Perilaku Hidup Bersih Sehat (PHBS) in school environment, were defined as good (score ≥ 16) and bad (score < 16).

**Statistical analysis**
The significant test in comparing the characteristics of the two study groups used chi-square test. The criterion of significance used was p value. P value ≤0.05 was consider significant statistically. The data obtained was recorded in a special form and then processed with SPSS version 21.0 for Windows

3. Results
There were 224 out of 1,658 subjects experiencing RAP at both criterias. There were 45 students who had H.pylori using serology examination. Accordingly, the proportion of RAP was 13.5% (95% CI 11.8%–715.2%) and the proportion of H. pylori infection in students with RAP was 45.4% (95% CI 35.7%–55.3%).

![Study Flow Diagram](image)

Table: Differences of characteristic children of RAP with H. pylori positive and negative.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Children with RAP</th>
<th>Total N=99</th>
<th>p* Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H. pylori Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>H. pylori Negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>N=45</td>
<td>N=54</td>
</tr>
<tr>
<td>Junior High School (12-15 tahun)</td>
<td>16</td>
<td>33</td>
<td>49</td>
</tr>
<tr>
<td>Senior High School (15-18 tahun)</td>
<td>29</td>
<td>21</td>
<td>50</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>49</td>
<td>87</td>
</tr>
<tr>
<td>Mother’s Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>11</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>20</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>14</td>
<td>14</td>
<td></td>
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<tr>
<td>Economic Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>15</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>11</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

*Chi – Square Test*

Table shows from of all the characteristics compared only the age has significant difference. While gender, mothers education, family income level, family history of RAP and hygienity level have no significant difference between positive and negative H. Pylori infection in children with presenting RAP. The characteristics which has no significant differences none which has p value < 0.25 so that the multivariate logistic regression analysis could not be performed.

4. Discussion
The proportion of RAP in this study was 13.5%. The prevalence of RAP in UK, United States, Europe, Malaysia, Bangladesh and Sri Lanka ranged from 10% to 19% [4,30,31]. In this study, the proportion of H. pylori infection in children with RAP was 45.4%. This figure is slightly lower than the proportion of H. pylori infection in RAP children in similar studies, such as 58% in Jakarta and 54% in Bandung [11-13].

In this study H. pylori infection was different between senior high school group and junior high school group and statistically there was a significant difference (p = 0.011). The proportion of H. pylori infection in senior high school group was higher than junior high school group. The studies in Saudi Arabia, Pakistan, Brazil dan Portugal which suggested that H. pylori infection was associated with increasing age but the study in Pakistan reported age had no significant association with H. pylori infection[10,18,21,25, 27]. The reasoning about age was associated with H. pylori infection is still unknown.

In our study there was no statistically significant difference in sex rates between RAP children with both positive and negative H. pylori infections. Several studies also had showed that gender had no association with H. pylori infection [10,18,19,21,27].

There was no significant difference in mother education level to H. pylori infection. The study in Pakistan, Portugal and Brazil which used bivariate analysis in their statistic analysis reported that mothereducation was not related to the incidence of H. pylori infection [18, 25, 27]. Some studies reported that mothereducational level is a risk factor for H. pylori infection[32]. Studies carried out in Belgium, Hong Kong and China which using multivariate analysis reported that mothereducation is a risk factor for H. pylori infection [17, 23, 24].

Based on the family income level, we did not find any differences in family income level between RAP children with positive and negative H. pylori infection. The studies in Europe and Turkey which using bivariate analysis reported...
that low income level was not a significant risk factor for H. pylori infection[22,26]. Our study had different result with a study in Pakistan using chi square test (bivariate) analysis which reported the significant differences of the family income level between RAP children with both positive and negative H. pylori infections [10]. This variation was due to the differences in the patient inclusion criteria, and the diagnosis method for H. pylori infection. Some studies showed that socioeconomic levels including income levels was the most important risk factor for H. pylori infection[32]. Studies in pediatric population conducted in Saudi Arabia and Tunisia which using multivariate logistic regression analysis reported that family income level was a risk factor for the occurrence of H. pylori infection[21,27].

Based on the history of RAP in the family, there was no difference between RAP child with positive and negative H. pylori infection. The study conducted in Pakistan using bivariate analysis reported that the family history of dispesia had significant association with H. pylori infection [10]. The studies conducted in Saudi Arabia and China using multivariate logistic regression analysis reported that family history of H. pylori infection was a significant risk factor for the occurrence of H. pylori infection in children [10,17].

Based on hygiene level, in our study there was no difference of hygiene level between RAP children with positive and negative H. pylori infection. The study conducted in Portugal using bivariate analysis showed that the hygenity level was not associated with H. pylori infection[27]. The study conducted in Brazil using multivariate logistic regression analysis reported that poor hygiene was a risk factor for H. pylori infection [25].

This is the first study in Indonesia to evaluate the existence of differences in several characteristics of H. pylori infection in RAP children with the population of school age children suspected to be the most susceptible of H. pylori infection. Our study has several limitations. First, the sample was limited to 99 children of RAP. Thus our findings of this study should be interpreted with caution because the sample size may have led on the underestimated of the strength of the difference in both groups. The second, the parameter of socioeconomic characteristics were limited only on the assessment of maternal education aspects, family income levels and hygiene levels only, other parameter such as having history of the possibility of H. pylori infection was subjective. Hygiene level parameter is a subjective parameter and is only based on the history taking.

We conclude the prevalence of recurrent abdominal pain was 13.5% and the proportion the H. pylori infection in RAP was 45.4%. There was significant difference in age group but no differences in gender, mother’s education, socioeconomic status, family history and hygiene status among RAP children with positive and negative H. pylori infection. Further research is needed to investigate the characteristics of H. pylori infection in children with RAP.

**Funding**

This study was funded by Academic Leadership Grant (ALG) Universitas Padjadjaran

**Conflict of Interest**

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

**Acknowledgements**

The author are grateful to all students and Laboratory of serology, Dr. Hasan Sadikin General Hospital, Bandung, Indonesia

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