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) isa common problems 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 RAPinAugust to September 2017. Infection ofH. 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 withp 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. Pyloriinfection 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 painmay 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 levels[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] andno association with hygienity [27]. There are differences in research results of the factorsthat affectingH. pyloriinfection 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 Indonesiafrom 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 are 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 parentswho fulfilled the inclusion criteriafilled theinformed consent, and to beexamined the serum anti H. pylori IgGusingBioM pylori kit(local antigen of Mataram) that had a sensitivity of 95% and specificity of 92%. [29]The result from the examinationwas 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 IgGwas positive. Mother educationstatus 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 $\geq$ 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 significancy used was p value. P value $\leq$0,05 wasconsider significant statistically. The data obtained was recorded in a special form and then processed with SPSS version 21.0 forWindows

3. Results

There were 224 out of 1,658 subjects experiencing RAP at both schools, 99 students of which met the inclusion criterias. There were 45 students who had H.pylori using serology examination. Accordingly, the proportion of RAPwas 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%).
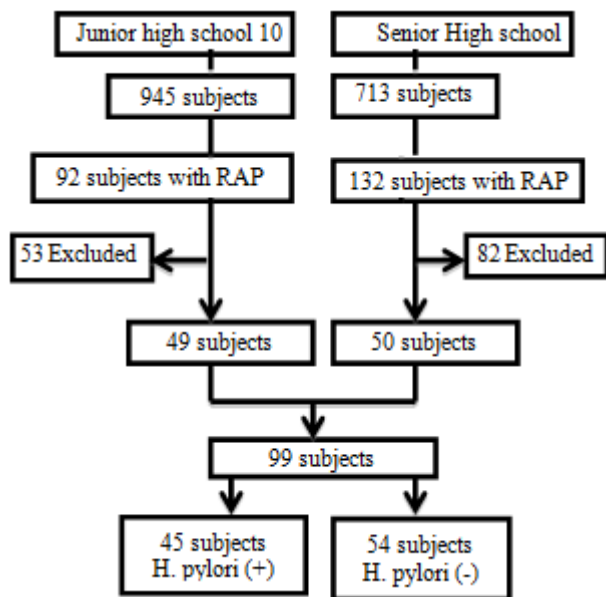

Figure: Study Flow Diagram

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

Variabel	Children with RAP		Total N=99	p* Value
	H. pylori Positive N=45	H. pylori Negative N=54		
Age				
Junior High School (12-15 tahun)	16	33	49	0.011
Senior High School (15-18 tahun)	29	21	50	
Gender				
Male	7	5	12	0.339
Female	38	49	87	
Mother's Education				
Low	11	19		0.509
Middle	20	21		
High	14	14		
Ecnomic Status				
Low	15	18		0.815
Middle	11	16		

High	19	20		
Family History				
Yes	19	29		0.255
No	26	25		
Hygiene Status				
Good	45	54		11.000
Fair/Poor	0	0		

* Chi – Square Test

Table shows from of all the characteristics compared only the age has significant difference.While gender,mother educational level,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 diffrences 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 prevalenceof 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 groupand 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 sthe study in Pakistan reported age had no significant association with H. pylori infection[10,18,21,25, 27].The reasoning about age wasassociated 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 studiesalso had showed that gender had no association with H. pylori infection [10,18,19,21,27].

There was no significant differencesinmother education level to H. pylori infection. The study in Pakistan, Portugal and Brazil which used bivariate analysisin their statistic analysis reported that mothreeducation was not related to the incidence of H. pylori infection [18, 25, 27]. Some studies reported that motherseducational 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 mothereeducation is a risk factor for H. pylori infection [17, 23, 24].

Based onthe 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 analysisreported

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 whichreported the significant differences of the family income levelbetween RAP children with both positive and negative H. pylori infections [10].This variation wasdue 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 populationconducted in Saudi Arabia and Tunisia which using multivariate logistic regression analysis reported that family income level was a risk factorfor 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 dispepsia 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 Portugalusing bivariate analysis showed that the hygienity 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. Fist, 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 neededto investigate the characteristics of H. pylori infection in children with RAP.

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