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Epidemiological Aspects of *Helicobacter Pylori* Infection in Children in Brazzaville

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ABSTRACT

Objectives: *To determine the prevalence of Helicobacter pylori infection in Brazzaville, to describe the epidemiological characteristics of infected children and to identify the factors favoring contamination.*

Patients and Methods: *cross-sectional and analytical study for seven months in health centers in Brazzaville, based on the detection of the fecal antigen of Helicobacter pylori by qualitative immunochromatography from the stools of children whose age was between 2 and 17 years old.*

Results: *The prevalence of helicobacter pylori infection in children was 38.36%. The female sex was predominant with a sex ratio of 1.76.The mean age of the children was 8.4 ± 4.39 years (range: 2 and 17 years). Children living in district 3 (Poto-Poto) were the most infected (P <0,000). Children between 5 and 9 years of age and those with primary education were the most infected ((P <0.05). The factors favoring contamination of Hp infection were the place of residence (p = 0.00), the age between 5-9 years (P <0.05), the age of the guardian between 35-44 years (P <0.03), the traditional type of latrine (P <0.05), the absence of hand washing before and after meals and after going to the toilet (p <0.05).*

Conclusion: *Helicobacter pylori infection is common in children in Brazzaville. It is mainly the prerogative of young children. Factors favouring contamination are place of residence, age between 5-9 years, guardian's age, type of latrine and lack of hand washing.*

Keywords

Child, *Helicobacter pylori*, Faecal antigen, Brazzaville.

Introduction

Helicobacter pylori (*Hp*) infection is a public health problem. It is a cosmopolitan condition because around 50% of the world's population is said to have it [1,2]. Prevalence is low from 1 to 30% in developed countries [3]. However, it is high and ranges from 40 to 91.3% in developing countries [4,5] including Congo, where it is 48.7% in children [6]. The diagnosis of *Hp* infection is easy and is based on the identification of the bacteria by invasive and non-invasive means [7].

However, testing for *Hp* antigen in the stool is the most appropriate technique in children because it is simple, specific, highly sensitive and above all non-invasive [8,9]. The aim of this work was to describe the epidemiological aspects of children infected with *Hp* in Brazzaville and to identify the factors favoring the contamination.

Patients and Methods

This was a cross-sectional, descriptive and analytical study

carried out between March and September 2018 in the Pediatrics departments of the University and Hospital Center and the base hospitals of Brazzaville. The general population consisted of children received in consultation in the services selected during the study period. We included in the study, children whose age was between 2 and 17 years for which we obtained the signed consent of the parents. Children on proton pump inhibitors, antisecretory agents and antibiotics for four weeks and those whose parents were not consented to the study were not included. Children under 2 years of age were not taken into account due to the lack of autonomy.

We carried out a systematic sampling of the children as they were admitted after an etiological investigation; A pre-established survey sheet was used to collect the information. The variables studied were epidemiological (age, sex, level of education), socio-demographic: place of residence (represented by the 9 districts of our capital city, namely: Makélekélé, Bacongo, Potopoto, Moungali, Ouenzé , Talangai, Mfilou, Madibou and Djiri), the size of the household, lifestyle such as the type of latrine used, the source of water and hand washing, whether at mealtimes and after the latrines have biological (detection of the fecal Hg antigen (Ag) in fresh stools of children, carried out without any preparation). The outcome measures were the detection of the fecal *Hp* antigen by the presence of a line (negative test) or two lines (positive test) on the strips of the rapid diagnostic test.

Feces emitted and transported to the laboratory up to one hour after collection has been sheltered from excessive heat, were considered fresh stool. Tap water is running water, transported by a pipeline network from its collection point (source, forge, river, river, groundwater, sea), to users' taps, made potable by a regulated treatment and disinfection center, in particular the national water distribution company in the acronym SNDE, then stored in one or more tanks (water tower) while waiting to be consumed. It becomes private tap water when it is distributed directly by the SNDE in a household or public tap water (fountain, borehole) when it is available for a large number of people (public buildings or neighborhoods). Well water is non-potable water, devoid of any health benefits from vertical earthwork, mechanized through a pulley or a container (traditional or traditional well), allowing the exploitation of a water table. underground water. This rises to ground level using a bucket or a manual pump. Spring water meets the same requirements as natural water, except that its content of mineral salts and trace elements is not always stable.

The traditional latrine is a pit dug in loose soil, without a drainage system, covered either by an assembly of branches or by a concrete slab centered by a hole for the passage of excrement. The modern latrine is a sanitary with a flushing system or siphons to evacuate the excrement in a septic tank. The chamber pot, commonly called a vase, is a container with or without a lid on which the child sits to do his business. Afterwards, the content is emptied into the latrine. Data entry and statistical analysis was done with Cs pro, SPSS and Excel software. The quantitative variables were expressed as an average and / or standard deviation and the qualitative variables as a percentage. Pearson's Chi² test allowed the comparison of the variables. The significance level required was a value of $p \leq 0.05$.

Results

During the study period, 318 children were included. Of these 122 had a positive fecal *Hp* antigen test, a prevalence of 38.4%. Female children represented (n = 203) or 63.8% of the study population and male children (n = 115) 36.2%. The F / G sex ratio was 1.76. The mean age of the children was 8.4 ± 4.39 years (range: 2 and 17 years). Children aged 5 to 9 were the most infected (n = 109), 34.3%. According to the level of education, children with a primary level were the most represented (n = 143; 44.8%), followed by those at the secondary level (n = 71; 22.3%), of children out of school (n = 6; 19.2%), preschoolers (n = 40; 12.6%) and children of higher education (n = 3; 0.9%). The distribution of the children according to the carrying of *Hp* according to the place of residence is represented in table 1.

Borough	n (%)	*Hp* fecal Ag result Positive n (%)	Detection Negative n (%)	p-value
Makélékélé	18 (5.66)	8(44.44)	10 (55.55)	
Bacongo	15 (4.72)	7 (46.66)	8 (53.33)	
Poto-poto	11(3.46)	7 (63.63)	4 (36.36)	0,000
Moungali	14 (4,40)	8 (57,14)	6 (42,85)	
Ouenze	20 (6,29)	11 (55)	9 (45)	
Talangaï	96 (30,19)	56 (58,33)	40 (41,66)	
Mfilou	37 (11,64)	4 (10,8)	33 (89,18)	
Madibou	5 (1,57)	2 (40)	3 (60)	
Djiri	102 (32,08)	19 (18,62)	83 (81,37)	

Table 1: Distribution of carriage of *Hp* in children according to place of residence.

The average age of the tutor was 42.65 ± 10.15 years with extremes from 17 to 70 years. According to the age of the tutor, the distribution of children was as follows: less than 35 years (n = 81; 25.5%), between 35-44 years (n = 110; 34.6%), including age between 44-54 years (n = 78; 24.5%) and over 55 years (n = 49; 15.4%). The children belonged to a family of low socio-economic level in 65% (n = 207) of cases, of average level 78% (n = 78) and of high level in 10.38% (n = 33) of cases. The average number of people living in the household was 6.19 ± 2.59 (range: 2 and 11 people). Depending on the size of the household, the children were distributed as follows: 1- 4 people (n = 96; 30.19%); 5-7 people (n = 134; 42.14%) and> 8 people (n = 88; 27.67%).

The distribution of children according to lifestyle is shown in Table 2.

The factors favoring the contamination of children by *Hp* were the place of residence (p = 0.00), the age between 5-9 years (P <0.05), the age of the guardian between 35-44 years (P <0.03), the type of traditional latrine (P <0.05), the absence of hand washing before and after meals and after going to the toilet (p <0.05).

Variables		n	%
Water source	Public tap	229	72,01
	Private tap	49	15,41
	Spring water	23	7,23
	Well water	17	5,35
Type of latrine	Traditional	204	64,15
	Modern	83	26,10
	Pot	31	9,75
Hand washing	Before the meal	252	79,25
	After lunch	249	78,30
	After going to the toilet	195	61,32

Table 2: Distribution of children according to lifestyle.

Discussion

This work reports the results of a cross-sectional study on the epidemiological aspects of children infected with *Hp* in Brazzaville. *Hp* is a germ with carcinogenic power, responsible for an acute infection of the gastric mucosa which can progress to chronicity, then gastric cancer. This is therefore a worrying situation, hence the importance of early detection to prevent dreadful complications. The geographical location of our study frame made it possible to receive children from all the boroughs of the city. The diagnostic method chosen for the detection of monoclonal *Hp* Ag in stools, based on the principle of immunonochromatography has the advantage of being more reliable in children because of its maneuverability, its sensitivity and its specificity compared to the test to urease on gastric biopsies or Elisa serology.

However, our study admits a selection bias because participation in the study was conditional on obtaining the parents' signed consent beforehand. The prevalence of *Hp* infection in children in Brazzaville is 38.4%. Our result is weaker than that of Ibara et al. [6] who reported 48.7% in the same country in 2005 and those found by other African studies, where prevalences vary between 40 and 91.3% [4,5]. This discrepancy could be explained on the one hand by the methodological differences relating to the sampling, the age groups of the children, and the environmental factors. On the other hand by the *Hp* Ag detection method. Indeed; Some used diagnostic tests for stool Ag, others serological, bacteriological and / or histological tests. We noted a female predominance with a sex ratio of 1.76.

However, the difference is not significant between *Hp* and the sex of the children. This result is correlated with the female predominance of the Congolese population as described in the report of the Congo Demographic and Health Survey (EDSC-II) [10]. This feminine tendency is also reported by several authors [11,12]. The majority of the infected children in our study had an average age between 5 and 9 years, followed by those aged 10-14 years. This result could be explained by the fact that children with an age between 5-14 years constitute the base of the age pyramid of the Congolese population [10].

Senbajo et al. [13] in Nigeria and Masoodpoor et al. [14] report a different average age around 12.5 years; this because of the age groups considered in their studies. The majority of infected children were not in school, this could be explained by the fact that in the Congo, children under the age of 5 are not in school. We found a significant statistical link between *Hp* and education level. This is explained by the fact that the age below 5 years does not correspond to the schooling age of children in the Congo. This result cannot be compared with others since this variable is not described in the literature. All of the city's boroughs were represented, albeit unevenly. Depending on the place of residence, children resident in Poto-Poto are the most infected. But with no significant difference between *Hp* and the place of residence.

This could be explained by the fact that these are the old districts where we observe a remarkable overcrowding and unhealthy conditions. During this study, we assessed promiscuity within households. The children most infected in the population concerned were those living in a household of 1-6 people, with no significant statistical link between *Hp* and the size of the household. This result is higher than that of the ESDC-II study, which reports an average of 4.3. However, this result could be explained by the fact that large households are infrequent in urban areas [10]. Ategbo et al. [12] in Gabon and Etukudo et al. [15] in Nigeria report results close to ours, due to the similar living conditions in these respective countries. Children whose guardians were between 35-44 years old were the most infected with a significant statistical link.

This result is attributable to the prolonged absence of parents of this age group from the home due to the worrying professional activity. The socio-economic assessment made it possible to classify the children into three categories (low, medium and high) in this work. The low level was the most represented. This result corroborates with that of the ESDC-II, the "majority of Congolese living below the poverty line" [10]. Our result can be superimposed on that of Senbajo et al. [13] in Nigeria. The traditional latrines were the most used. This result is consistent with data from the EDSC-II study, which reports that more than two thirds of Congolese households only have rudimentary latrines [10].

Children using public tap water were the most represented in the infected population in our study, although there was no significant difference observed between *Hp* and the water source. This finding is similar to that of the EDSC-II which reports that « 76% of Congolese households use water from an improved source mainly from public taps or fountains ». We took into account hand washing, both before and after the meal, and after going to the latrine to identify certain risky behaviors in the population studied. Children who did not wash their hands were the most infected (61.3%). The link between *Hp* infection and handwashing was statistically significant ($p < 0.05$). Our results would be explained by the poor hygienic conditions of our population. Indeed, with regard to the lack of hand washing before or after the meal, the hypothesis of oral-oral contamination is likely. Likewise, the absence of hand washing at the end of the latrine suggests oro-fecal contamination.

The following factors: the place of residence, the age between 5-9

years and the education level of the children, the age of the tutor between 35-44 years, the type of latrine and the absence of hand washing have been identified as factors favoring the contamination of children with *Hp*. Also the type of artisanal latrine and hand washing are closely linked to the harmful living conditions of the population. Our results corroborate those of the EDSC-II study carried out in Congo. Also the type of artisanal latrine and hand washing are closely linked to the harmful living conditions of the population. Our results corroborate those of the EDSC-II study carried out in Congo.

Conclusion

The prevalence of *Helicobacter pylori* infection is high in children in Brazzaville. It is mainly the prerogative of the young child. The factors favoring contamination are the place of residence, the age between 5-9 years, the age of the tutor between 35 - 44 years, the type of latrine and the absence of hand washing. Prevention involves systematic mass screening for fecal *Hp* Ag in order to prevent complications linked to this infection.

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