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**Author:** Mourad-Baars, Petronella Elisabeth Cornelia  
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SECTION B
PREVALENCE
CHAPTER 4

Low prevalence of *Helicobacter pylori* infection in young children in the Netherlands

P.E.C. Mourad-Baars, H.W. Verspaget, B.J.A. Mertens and M.L. Mearin

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ABSTRACT

Aim of the study
To investigate the seroprevalence of *Helicobacter pylori* infection in young children from the general population in the Netherlands.

Methods
Determination of IgG antibodies against *H. pylori*, using an enzyme-linked immunosorbent assay technique (cut-off 0.32 Absorption index (AI)), in serum from 1258 children who were 2-4 years of age. The serum was obtained from a serum bank of 6127 children who attended the community child healthcare centers in the Dutch province of Zuid-Holland.

Results
In general, we found a seroprevalence of 1.2% of *H. pylori* infection, with a significant difference between the children with parents who were both Dutch (0.5%) and the children with at least one non-Dutch parent (2.6%) (p<0.001).

Conclusions
The prevalence of *H. pylori* infection in young infants in the general population in the Netherlands is low. Children with at least one non-Dutch parent form a risk group, however, for *Helicobacter pylori* infection in the Netherlands.

Keywords: *Helicobacter pylori*, epidemiology, infants, children, seroprevalence, the Netherlands.
The absorbency index was calculated from the mean of two readings of the optical density of the serum, corrected for a uniform standard positive serum used in all assays. Sera with an absorbency index higher than 0.32 are considered positive for IgG antibodies against *Helicobacter pylori*. The sensitivity of the ELISA is 98.5% with a specificity of 92% for *Hp* infection. The study was approved by the medical ethical committee of the Leiden University Medical Center.

Statistical analysis was based on the two-sample t-test for proportions and on the $\chi^2$–square test. For the comparison of prevalence rates with observed proportions from earlier studies, the one-sample t-test for proportions was used, using the previously observed proportions as null hypothesis.

## RESULTS

We found anti- *H. pylori*-IgG titers higher than 0.32 AI in 15 children, indicating *H. pylori* infection in 1.2% of the children aged 2-4 (Table 1). This frequency is lower than the one previously found among Dutch children (Table 2). None of the children with celiac disease had increased anti- *H. pylori*-IgG titers in serum.

A significant difference was seen in the frequencies of *H. pylori* infection in the children with two Dutch parents (0.5%) and in those with at least one non-Dutch parent (2.6%; $p<0.001$ Table 1). The non-Dutch parents of all the children with *H. pylori* infection were, one case excepted, not European and in six cases belonged to the most common ethnical minorities in the Netherlands: that is, Surinamese, Moroccan and Turkish. From the entire group of non-Dutch parents, 58 came from Africa, 75 from Asia, 161 from Europe, 10 from North-America, 85 from South-America and 38 from the Middle East.

## DISCUSSION

To our knowledge this is the first study on the prevalence of *H. pylori* infection in young children in the Netherlands. We found a frequency of *H. pylori* infection lower than the one found in the Netherlands before (Table 2). A possible reason for this may be the young age of the children in our study-group, as it is well-known that the frequency of *H. pylori* infection increases with age. Another possible reason for the low frequency of *H. pylori* infection in our group may be the good health status of the children, as they were attending the healthcare centers, which are preventive and not curative institutions in the Netherlands. The studies on *H. pylori* infection previously performed in the Netherlands concerned older children with health complaints who attended the hospital because of abdominal pain.

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**Table 1. Frequency of positivity of IgG antibodies against *H. pylori* (Hp-IgG) in 1258 Dutch children.**

<table>
<thead>
<tr>
<th>Children</th>
<th>N</th>
<th>Positive Hp-IgG* N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both parents of Dutch origin</td>
<td>800</td>
<td>4 (0,5)</td>
</tr>
<tr>
<td>At least one non-Dutch parent</td>
<td>427</td>
<td>11* (2,6)</td>
</tr>
<tr>
<td>Countries of origin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suriname</td>
<td>48</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Morocco</td>
<td>34</td>
<td>2 (6)</td>
</tr>
<tr>
<td>Turkey</td>
<td>31</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Germany</td>
<td>17</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Ghana</td>
<td>4</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Somalia</td>
<td>3</td>
<td>2 (66)</td>
</tr>
<tr>
<td>India</td>
<td>2</td>
<td>1 (50)</td>
</tr>
<tr>
<td>Other countries</td>
<td>288</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Celiac disease</td>
<td>31</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>1258</td>
<td>15 (1,2)</td>
</tr>
</tbody>
</table>

(* = $p<0.001$)

**Table 2. Frequency of *H. pylori* infection in pediatric populations in the Netherlands**

<table>
<thead>
<tr>
<th>Author</th>
<th>Age (yrs)</th>
<th>n</th>
<th>Population</th>
<th>Serum test</th>
<th>Year of investigation</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van de Meer et al 1992</td>
<td>11± 7</td>
<td>82</td>
<td>Hospital</td>
<td>ELISA</td>
<td>1989</td>
<td>8,5±      5,1</td>
</tr>
<tr>
<td>Roosendaal et al 1997</td>
<td>6-8  12-15</td>
<td>154</td>
<td>General: viral infection</td>
<td>ELISA</td>
<td>1993</td>
<td>9</td>
</tr>
<tr>
<td>Schipper et al 2000</td>
<td>8,2± 6,5</td>
<td>279</td>
<td>Hospital</td>
<td>Pyloriset EIAG</td>
<td>1998-99</td>
<td>9,7         5,6</td>
</tr>
<tr>
<td>Actual study</td>
<td>2-4</td>
<td>1258</td>
<td>General: healthcare centers</td>
<td>ELISA</td>
<td>1998</td>
<td>1,2</td>
</tr>
</tbody>
</table>

ELISA enzyme-linked immunosorbent assay; EIAG enzyme immuno assay for IgG

a Children with recurrent abdominal pain.

b Mean age
Chapter 4

Prevalence in the Netherlands

The results of an Italian study of 81 children with celiac disease 22. We found that the children with at least one non-Dutch parent had a significantly higher prevalence of H. pylori infection (2.6%) than the children with two Dutch parents (0.5%), (p<0.001). Interestingly, only 1 of these 11 children had European non-Dutch parents (Germany, Table 1). Children with parents from Ghana, Somalia and India were relatively frequently infected by H. pylori. The number of children in this category, however, is small (n = 9) and the results should be interpreted with caution. The frequency of H. pylori infection found among the children with parents from the three largest ethnical minorities in the Netherlands (i.e. Surinamese, Moroccan and Turkish) was 5.3%. This is significantly higher in comparison with the frequencies in children from Dutch parents (0.5%) (p<0.001) and in children from non-Dutch parents in general (2.6%) (p<0.05). No information is available about the prevalence of H. pylori infection in Morocco, Somalia, Suriname and Ghana, but it is assumed to be high. The seroprevalence of H. pylori in 346 children from eastern Turkey was 44% with a corresponding one of 85% in their mothers and 76% in the fathers 21.

In conclusion, we have found that the frequency of H. pylori infection among young children in the Netherland in general is low, but that it is significantly higher among Dutch children from the ethnical minorities. In developed countries the prevalence of H. pylori infection is rapidly decreasing mainly due to better socio-economic conditions, but in developing countries the incidence of infection still is very high. Our results indicate that immigration to Europe from countries with high rates of H. pylori infection induces the existence of a group of children with high risk for H. pylori infection. Pediatricians should be aware of this fact, as H. pylori-pathology may be particularly frequent among these children who will benefit from early diagnosis and treatment.

Acknowledgments

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REFERENCES