

Relationship between *Helicobacter pylori* and Dental Caries

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ABSTRACT

The present study aimed at the evaluation of the association between *H.pylori* and dental caries by a systematic review and meta-analysis study. We searched databases, including PubMed and Google Scholar using the following keywords in English: *H.pylori*, dental caries. Among 113 articles reviewed that included 3595 patients samples. Results showed that association between *H. pylori* and dental caries was significant with OR (odds ratio) = 1.13. These results reveal that *H. pylori* could be one of the main causes of periodontal diseases. We recommend a novel approach should be employed for the complete management of *H. pylori* infections.



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1. INTRODUCTION

Helicobacter pylori (*H. pylori*) is a widely distributed microbe and has been linked to a variety of disorders such as coronary heart disease, thyroid disease, anemia, diabetes, dyslipidemia, gastric lymphoma and hypothyroidism [1- 4]. *H.pylori* infection is diagnosed by many diagnostic techniques, including culture, histology, serology, stool antigen and urea breath test [5], [6].

The strongest confirmation to date involves the bacterium *H. pylori* and its position in gastric cancer. *Helicobacter pylorus* colonizes the human stomach and duodenum. The mechanism by which *H. pylori* causes cancer may involve chronic inflammation, or the direct behavior of some of its virulence factors, for instance, CagA has been implicated in carcinogenesis [7- 11].

Dental caries is an infectious disease of teeth which is characterized by tooth loss or localized destruction of the teeth caused by bacterial activity. *Streptococcus mutans* is the bacterium which is mainly involved in the process of tooth decay during dental caries [12], [13].

The oral cavity, as well as many other organs in the body, contains different types of bacteria. These bacteria live and multiply in an environment containing sugars, called fermented carbohydrates. When these carbohydrates are not brushed from the teeth, these bacteria convert them into acids, within half an hour, leading to dental plaque, which stick to the teeth. The acid in dental plaque attacks the hard outer layer of the tooth "enamel" [14], [15].

2. MATERIALS AND METHODS

2.1 Protocol

This review was conducted based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [16].

2.2 Eligibility Criteria

To identify relevant studies, a systematic review of cross-sectional and case-control studies relating to dental caries was performed. To avoid bias, all steps including search, selection of studies, quality assessment, and data extraction, were conducted by two investigators independently. Any disagreement was reviewed by a third investigator.

2.3 Study Characteristics

Exclusion criteria including sample size, lack of relevance to the topic, letters to the editor, and case report.

2.4 Data Sources

Documents used in this systematic review were in English, and obtained from scientific databases such as Scopus, PubMed, Science Direct, Web of Science, Springer, and Google Scholar. The following keywords were used in the searches: *Helicobacter pylori* & dental caries. Some papers were excluded after reading the summary and/or the full text due to their non relevance to the topic, lack of criteria, and/or low quality.

2.5 Data Collection Process

In this study, a checklist of available studies was prepared. These included: the author's name, year of study, place of study, P-value, age. The 20-year period from 2000 to 2019 was used to retrieve the data analysed in this systematic review.

3. RESULTS

3.1 Study Selection

Whilst in the initial search, 113 studies related to dental caries were selected, after exclusion of those articles that were found to be irrelevant or of low or unclear quality, 15 studies successfully met the study criteria and thereby entered our systematic review.

3.2 Results of Studies

In a systematic review of studies, 15 case-control and cross-sectional studies fulfilled the inclusion criteria.

Among 113 articles reviewed that included 3595 samples, results showed that association between *H. pylori* and dental caries was significant with OR (odds ratio) = 1.13 (95% CI: 1.04 to 1.24). the OR of 1.13 relates to the 15 studies

We found that the majority of findings in the 15 selected papers (Table-1) on the relationship between dental caries & *H. pylori* suggested a positive link (i.e.a causative microbe for this disease), either in children or adults.

Authors' Name	Number of patients	Relationship	Age of patients	Location of the study	REF No
Hisham Yehia	48	Positive	Children	UAE	33
Komei Iwai	192	Positive	Adult	Japan	34
Peng Liu	841	Positive	Adult	China	35
Kolho	48	Negative	Children	Finland	36
Ying Liu	214	Positive	Children	China	37
Masakazu Hamada	87	Positive	Adult	Japan	38
Nelo Veiga	447	Positive	Children	Portugal	39
Alejandra Berroteran	32	Negative	Adult	Venezuela	40
Yi-Jian Ding	1050	Positive	Adult	China	41
Asim Dane	70	Positive	Children	Turkey	42
Carlos Eduardo Flores	38	Positive	Children	Mexico	43
Sahel Valadan Tahbaz	100	Negative	Adult	Iran	44
Pradeep Anand	134	Positive	Adult	India	45
Amir Eskandari	67	Positive	Adult	Iran	46
Renata Souto	225	Positive	Adult	Brazil	47

4. DISCUSSION

In earlier studies, the link between *H. pylori* infection has been highly controversial and confusing. In this study, the relationship between *H. pylori* infection and oral and dental problems was investigated. In summary, analyzing the results of this study, we found an association between the presence of *H. pylori* and oral and dental disease.

Furthermore, the results of this study indicated that *H.pylori* may be one of the risk factors responsible for

periodontitis. This result suggests that further research is necessary to investigate their pathogenicity. Prevention of dental caries and other diseases and early treatment of dental caries could therefore, decrease *H. pylori* infection. We understand that there have been conflicting reports in the literature regarding the presence of *H.pylori* in the oral cavity [17- 20].

In our study, the proportion of positive relationship between dental caries and *H. pylori* infection was 80%. This number is only restricted to caries and do not include other major dental diseases such as (dental pulp, dental plaque, periodontitis).

H. pylori is a pathogenic bacterium with worldwide prevalence causing gastritis, peptic ulcer, and/or gastric malignancy [21], [22]. The main symptoms in our patients were similar to those previously reported [22], [23] namely dyspepsia, nausea, abdominal pain and heartburn. The prevalence of *H. Pylori* in Saudi Arabia ranging between 50-80% according to the location of the study and the methods of diagnosis [24- 27].

It is believed that *H. pylori* is transmitted amongst people through the oral cavity. The hypothesis that the mouth is a reservoir for *H. pylori*, and therefore a potential source of gastric infection, is supported by several studies that have proved the presence of *H. pylori* DNA in saliva and dental plaque [28- 32]. In our current study we aimed to investigate the prevalence of *H. pylori* and its relationship with dental caries. We found that the majority of *H. pylori* is linked with dental caries.

5. Conclusion

Our study found that in both adults and children who were infected with *H. pylori* was shown to be the main reservoir in the oral cavity. These results reveal that *H. pylori* could be one of the main causes of periodontal diseases. We recommend a novel approach should be employed for the complete management of *H. pylori* infections”.

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