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# BIOFILM DENTAL, A RESERVOIR FOR HELICOBACTER PYLORI IN PATIENTS WITH CHRONIC GASTRITIS

BIOFILM DENTAL, UN RESERVORIO PARA HELICOBACTER PYLORI EN PACIENTES CON GASTRITIS CRÓNICA

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## ABSTRACT

**Objective:** To determine the prevalence of helicobacter pylori in dental biofilm in patients with chronic gastritis in the gastroenterology service of the Hospital María Auxiliadora. **Methods:** A cross-sectional descriptive observational study was carried out, working with a population of patients seen in 1 calendar year, of which only 100 patients met the inclusion and exclusion criteria. A collection was made for the variables age, gender, helicobacter pylori in dental biofilm, and helicobacter pylori in gastric mucosa biopsy. The relative frequency of Helicobacter Pylori in dental biofilm in patients with chronic gastritis was calculated and an exploratory chi2 test was performed for helicobacter in dental biofilm and helicobacter in gastric mucosa biopsy. **Results:** A 66% prevalence of helicobacter pylori in dental biofilm was detected in patients with chronic gastritis, in turn, 48% of the total of this group presented positive helicobacter pylori in gastric mucosa biopsy. Of the patients positive for helicobacter pylori in gastric mucosa, 83.33% presented positivity in dental biofilm. An association was found for the variables helicobacter pylori in dental biofilm and helicobacter pylori in gastric mucosa biopsy with a p-value = 0.002. **Conclusion:** A high prevalence of helicobacter pylori was found in the dental biofilm of patients with chronic gastritis and an association between dental biofilm and gastric mucosa biopsy for helicobacter pylori.

**Key words:** Helicobacter pylori; Dental plaque; Gastritis; Helicobacter infections; Endoscopy (source: MeSH NLM).

## RESUMEN

**Objetivo:** Determinar la prevalencia de helicobacter pylori en biofilm dental en pacientes con gastritis crónica en el servicio de gastroenterología del Hospital María Auxiliadora. **Métodos:** Se realizó un estudio observacional descriptivo transversal, trabajándose con una población de pacientes atendidos en 1 año calendario, de los cuales solo 100 pacientes cumplieron con criterios de inclusión e exclusión. Se realizó una recolección para las variables edad, sexo, helicobacter pylori en biofilm dental y helicobacter pylori en biopsia de mucosa gástrica. Se calculó la frecuencia relativa de Helicobacter Pylori en biofilm dental en pacientes con gastritis crónica y de manera exploratoria se realizó una prueba de chi2 cuadrado para helicobacter en biofilm dental y helicobacter en biopsia de mucosa gástrica. **Resultados:** Se detectó una prevalencia de helicobacter pylori en biofilm dental de 66% en los pacientes con gastritis crónica, a su vez un 48% del total de este grupo presento helicobacter pylori positivo en biopsia de mucosa gástrica. De los pacientes positivos para helicobacter pylori en mucosa gástrica un 83,33% presento positividad en biofilm dental. Se encontró asociación para las variables helicobacter pylori en biofilm dental y helicobacter pylori en biopsia de mucosa gástrica con un valor p = 0.002. **Conclusión:** Se encontró una prevalencia elevada de helicobacter pylori en biofilm dental de pacientes con gastritis crónica y una asociación entre el biofilm dental y biopsia de mucosa gástrica para helicobacter pylori.

**Palabras clave:** Helicobacter pylori; Placa dental; Gastritis; Infecciones por helicobacter; Endoscopia (fuente: DeCS BIREME).

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## INTRODUCTION

Helicobacter pylori is a gram-negative bacillus that colonizes the gastric mucosa and can generate a series of gastric pathologies; dental biofilm is also an area of colonization for said microorganism, which if not taken into account could have a deleterious impact when trying to eradicate said microorganism from the gastric mucosa, since being an extra gastric reservoir could act as a region of potential reinfection[1,2,3,4]. Worldwide, helicobacter pylori have been estimated to rise to 4.4 billion infected people[5], in the continent of South America, a systematic review reported a prevalence of 69.26% (IC95% 64.54-76.99) in adults[6], at the national level prevalence of 58.7% has been reported in middle and high social strata and> 90% in low social strata[7]. The aforementioned highlights the importance of generating studies to identify factors that predispose to subsequent reinfection to medical treatment, in order to avoid the pathologies and complications of this bacterium.

Helicobacter pylori have virulence factors that influence the magnitude of the damage caused to the gastric mucosa, among which are urease and flagella that guarantee survival and subsequent colonization. Likewise, there are the effector toxins CagA, associated with a more severe inflammatory response and the presentation of MALToma, and vacA, involved in the development of peptic ulcer and gastric cancer[8-11].Infection by this bacterium over the years produces chronic gastritis, which can appear as atrophic, related to the appearance of peptic ulcer due to an imbalance between protective and dec destructive factors[12], and not atrophic, in which there is a loss of the mucous glands[13,14], being replaced by intestinal-type epithelium, called intestinal metaplasia, which can lead to dysplasia of either the gastric epithelium itself or the "intestinalized" one. Finally, if this dysplasia progresses, it will cause an adenocarcinoma[8,15,17]. Another associated entity is MALToma, a mucosa-associated lymphoma, in which H. pylori and specific T cells induce macrophages to produce a cytokine that generates the proliferation of B cells, called APRIL[11,17].

At the global level, there are several studies that have explored the prevalence of helicobacter pylori in dental biofilm in patients with chronic gastritis[2,18,19,20,21], at the national level in our bibliographic review only 1 was found article in this regard where Chumpitaz et[19] found a prevalence of 24.3% being the target population of socioeconomic class between medium and high, without having study subjects of low socioeconomic class, so the present study hopes to find a higher prevalence to that reported.

This article seeks to determine the prevalence of helicobacter pylori in dental biofilm in patients with a diagnosis of chronic gastritis, and exploratory to determine the association between helicobacter pylori in dental biofilm and helicobacter pylori in gastric mucosa biopsy. This is the first work at the national level to mention this association.

## METHODS

### Design and study area

An observational, descriptive, cross-sectional study design was carried out. Carried out at the Hospital National María Auxiliadora, where data was collected from all the patients treated in 2010. As a target population, all those patients diagnosed with chronic gastritis by the gold test of mucosa biopsy were taken gastric extracted by upper endoscopy.

### Procedures and variables

Within the selection criteria, age greater than or equal to 18 years was taken as inclusion criteria, expressing their desire to participate in the study through informed consent, within the exclusion criteria smoking patients were taken, diabetics, immunocompromised, pregnant, rheumatic diseases, previous diagnosis of chronic gastritis, benign and malignant gastric neoplasms, gastrostomies, anatomical functional malformations of the gastrointestinal tract.

Among the variables of importance, the positivity of helicobacter pylori in the gastric mucosa was determined using light microscopy as an instrument to visualize the bacteria in the gastric mucosa, this being the gold standard. For the variable positivity of helicobacter pylori in dental biofilm, the rapid urease test was performed, isolating a portion of dental biofilm extracted from the patient, which was introduced into duly labeled urea broth, and a positive result changes to a red color. In turn, sociodemographic variables such as age and sex of each of the patients were taken.

The information collected from each of the variables was recorded in a data collection instrument that was saved for subsequent analysis.

### Population and Sample

The present study took patients scheduled during 2010 for upper gastrointestinal endoscopy plus gastric mucosa sampling, which is why a sample calculation was not required; a total of 100 patients were worked with who met the criteria of inclusion and exclusion, using the Epidat open access epidemiological package, a precision of 7.9% was calculated for a statistical power of 80%, taking as a study the one carried out by Asqah et al.[2].

### Ethical Issues

The confidentiality of the subjects involved in the study was respected. No personal information of the patients was mentioned, it was approved by the evaluation committee of the Inca Garcilaso de la Vega University, as well as the approval of the Hospital National María Auxiliadora.

### Statistical analysis

The collection instruments of each subject were deposited in the program Excel to later be transported to the SPSS program for subsequent statistical analysis.

Descriptive statistics were presented by taking the mean and standard deviation for the quantitative variables age, in turn, the absolute and relative frequency was taken for the qualitative variables helicobacter pylori positive in gastric mucosa, helicobacter pylori in dental biofilm, and gender.

In turn, the analytical statistics presented in this work carried out in an exploratory way included the chi-square test to search for an association between the variables helicobacter pylori positive in gastric mucosa and helicobacter pylori in dental biofilm.

## RESULTS

Of the 100 study subjects evaluated, all presented the necessary data for each of the study variables in this article. The mean and standard deviation of age were 42.01 and 9.24 +/-, the percentage of male and female patients was 52% and 48% respectively, the percentage of helicobacter pylori in dental biofilm was 66% and the percentage of helicobacter pylori in the gastric mucosa was 48% (Table 1). Of the patients positive for helicobacter pylori in gastric mucosa, 83.33% presented positivity in dental biofilm. In an exploratory way, a statistical association was found using the chi-square test for helicobacter pylori in dental biofilm and helicobacter pylori in gastric mucosa with a P-value of 0.002 (Table 2).

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**Table 1.** Descriptive statistics.

| Variables | Results |
|---|---|
| **Helicobacter pylori in dental biofilm** | |
| Present | 66% |
| Absent | 48% |
| **Helicobacter pylori in gastric mucosa** | |
| Present | 48% |
| Absent | 52% |
| **Gender** | |
| Male | 52% |
| Female | 48% |
| **Age** | 42.01 +/- 9.24 |

For qualitative variables, the relative frequency was reported and for the quantitative variable the mean and standard deviation.

**Table 2.** Double-entry table.

| | Helicobacter pylori in gastric mucosa | | Chi-square statistical test |
|---|---|---|---|
| | Positive | Negative | |
| **Helicobacter pylori in dental biofilm** | | | |
| Present | 40 | 8 | P value = 0.002 |
| Absent | 26 | 26 | |

SPSS version 22 statistical package was used.

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## DISCUSSION

The present study found a prevalence of 66% of helicobacter pylori in dental biofilm in patients with chronic gastritis, differing from the results presented by Chumpitaz et al, in which prevalence of 24.3 was found % lower than the one we report, which could be explained by the socioeconomic stratum of the population of said study, which is medium-high(19); The article presented is aligned with the prevalence data reported by Asqah et al who reported a prevalence of helicobacter pylori in a dental biofilm of 65% in patients with dyspeptic symptoms in a hospital in Saudi Arabia(2)and with the work of Desai et al. who found a Helicobacter Pylori prevalence of 98% in a hospital in India(21); The present study was not aligned with the prevalence results reported by Chitsazi et al, which were 34.1% for patients with pathology diagnosis of chronic gastritis in a hospital in Iran(18), nor with those of Trevizani et al with a prevalence of 39% in a health facility in Brazil(20).

There is pathophysiological evidence that takes dental biofilm as a reservoir of helicobacter pylori for future reinfections in patients in patients who have completed antibiotic treatment for gastric infection of helicobacter pylori, dental biofilm is a difficult access environment for antibiotics, which makes The joint work of the dental service is of vital importance since this reservoir could be responsible for harboring Helicobacter strains that may develop antibiotic resistance(2,4,22).

Within the limitations of the study, it is worth mentioning that it was unicentric, in only one hospital, the population evaluated exclusively represented the lower middle socioeconomic stratum. This affects the external validity of the work. The present study can be extrapolated to adult populations that are cared for in the hospitals of the Ministry of Health at the level of metropolitan Lima. Studies that analyze the prevalence at the metropolitan lime level in each of the economic strata are recommended since in our bibliographic review no studies were found in this regard, analytical studies are recommended that can analyze the relationship between helicobacter pylori in dental biofilm and helicobacter pylori in gastric mucosa, as well as its association with anthropometric measurements to estimate obesity(23).

## CONCLUSION

A high prevalence of helicobacter pylori was found in the dental biofilm of patients with chronic gastritis and an association between dental biofilm and gastric mucosa biopsy for helicobacter pylori, confirming dental biofilm as a reservoir for potential reinfection of the gastric mucosa. Prospective studies are recommended to analyze this association.

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