

INPLASY PROTOCOL

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None declared.

Temporal trend of global *Helicobacter pylori* infection prevalence: a systematic review and meta-analysis based on studies from 1980 to 2022

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Review question / Objective: To explore the temporal trend of global *H.pylori* infection prevalence over the past four decades. Also, to probe its association with countries' income and universal health coverage levels.

Condition being studied: *Helicobacter pylori* (*H.pylori*), a gram-negative bacterium discovered by Marshall and Warren in 1983 as the chief 'culprit' for peptic ulcer, has attracted more and more attention to its prevalence worldwide. The discovery of *H.pylori* was a significant milestone in gastroenterology development. However, due to the non-uniform testing method, screening procedure, or indications, the time trend of its prevalence change is still ambiguous and controversial. Reported infection prevalence varies in diverse countries/regions, from lower than 30% among American populations to over 40% in the WestPacific region. Great difficulties were posed in evaluating the time trend by fluctuation and change of the *H.pylori* infection in different regions.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 October 2022 and was last updated on 06 October 2022 (registration number INPLASY2022100026).

INTRODUCTION

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METHODS

Search strategy: Pubmed: ((HP[Title/Abstract]) OR ((H\$ Pylori[Title/Abstract]) OR (pylori[Title/Abstract])) OR (((((Helicobacter nemestrinae[Title/Abstract]) OR (Campylobacter pylori[Title/Abstract])) OR (Campylobacter pylori subsp. pylori[Title/Abstract])) OR (Campylobacter pyloridis[Title/Abstract])) OR ("Helicobacter pylori"[Mesh]))) AND (((prevalence[Title/Abstract]) OR (seroprevalence[Title/Abstract])) OR (survery[Title/Abstract])) OR (incidence[Title/Abstract])) AND (1980/1:2022/6[pdat])

Embase: ('helicobacter pylori'/exp OR 'helicobacter nemestrinae':ab,ti OR 'campylobacter pylori':ab,ti OR 'campylobacter pylori subsp. pylori':ab,ti OR 'campylobacter pyloridis':ab,ti OR 'hpylori':ab,ti) AND ('prevalence':ab,ti OR 'incidence':ab,ti OR 'seroprevalence':ab,ti OR 'survey':ab,ti)

Embase: Date of pub From 1980-

1 'helicobacter pylori'/exp

2 'Helicobacter pylori':ab,ti OR 'H. pylori':ab,ti OR 'Campylobacter pylori':ab,ti OR 'helicobacter nemestrinae':ab,ti

3 'prevalence':ab,ti OR 'incidence':ab,ti OR 'seroprevalence':ab,ti OR 'survey':ab,ti

4 #1 OR #2

5 #2 AND #3 AND #4

MEDLINE: Date of pub From 1980

1 exp Helicobacter pylori/

2 (Helicobacter pylori or H pylori or Campylobacter pylori).ab,ti.

3 (prevalence or incidence or epidemiology or seroprevalence or survey).ab,ti.

4 1 or 2

5 3 and 4.

Participant or population: Studies reported the prevalence of H.pylori infection.

Intervention: Not available.(Report with prevalence).

Comparator: Not available.(Report with prevalence).

Study designs to be included: Retrospective study, population-based study, territory study.

Eligibility criteria: Studies with a limited age group (ex. Limited to undergraduate students) were not included. Also, studies that failed to demonstrate the prevalence of H.pylori infection among its targeted population were eliminated through the filtration stage. Available studies must provide the appropriate expression of the H.pylori infection prevalence and uncertainty. It should contain the situation with the 1) prevalence with CI (credibility interval) or SE (standard error) and 2) prevalence with sample size and infected population size. The included studies should not be selected intentionally, such as enrolling only immune deficiency patients.

Information sources: Data acquisition can be done by contacting with author by mail(yunhaoli@connect.hku.hk).

Main outcome(s): 278 records from six WHO divisions were finally included in this study. The global H.pylori prevalence altered from 53.32% in the 1980-1990 period to 42.85 in the 2011-2021 period. Prevalence change was relatively flat around 2000 and sharply declined in this decade. Prevalence tested by the serology method and mixed was higher than other diagnostic methods. Country's income level may also influence H.pylori infection prevalence.

Quality assessment / Risk of bias analysis: Two independent authors did quality assessments using the Newcastle-Ottawa Quality Assessment Scale (https://www.ohri.ca/programs/clinical_epidemiology/oxford.asp).

Strategy of data synthesis: Heterogeneity was assessed by use of the I^2 index and Cochran Q test. The selection of the random effects model or fixed effects model depended on the value of I^2 (random for $\geq 50\%$ and fixed for $< 50\%$). A Twosided P-value of less than 0.05 was deemed statistically significant. A weighted pooling method based on the study population was accomplished.

Subgroup analysis: Subgroup analysis was done by the group of regions, income level and health coverage.

Sensitivity analysis: Publication bias and sensitivity analysis was not performed due to methodological issues for prevalence studies.

Country(ies) involved: Hong Kong SAR, China.

Keywords: Prevalence, Epidemiology, Helicobacter pylori, Systematic review.

Contributions of each author:

Author 1 - Yunhao Li.

Author 2 - Fang Jiang.

Author 3 - Wai K Leung.