Relationship between H Pylori Infection, Food Quality and Peptic Ulcer: A systematic Review

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Abstract: Background: One of the most common causes of serious chronic bacterial infections is Helicobacter pylori (H. pylori). Objectives: This systematic review aims to comprehensively assess the association between H. pylori infection, food quality, and peptic ulcer disease. Methods: The systematic review helps to discuss and summarize several types of research that have looked at the H Pylori Infection, Food Quality, and Peptic Ulcer. The data search was done using the Web of six electronic databases there are ScienceDirect, EBSCO, PUBMED, BIOMED CENTRAL, CINAHL, and Google Scholar and only the English language was used. Results: A total of 16 studies were identified in the study. After identifying 16 articles with titles that matched the search query, they were evaluated for relevancy, quality, and risk of bias. The study's results were presented as four themes. six studies examined the Prevalence of H. pylori infection among participants. Five studies examined the Interaction between H. pylori infection and dietary factors in nursing policy three studies examined the analysis of dietary factors associated with peptic ulcer development and two studies examined the association between food quality indicators and peptic ulcer development in nursing administration. Conclusion: Peptic ulcer disease can arise after an infection with Helicobacter pylori. Damage to the mucosa and the formation of ulcers result from its colonization of the stomach mucosa, which disrupts the equilibrium between the secretion of gastric acid and the mucosal defense mechanisms.

Keywords: dietary habits, Helicobacter pylori, Saudi Arabia, risk factors.

1. INTRODUCTION

Helicobacter pylori (H. pylori) is one of the most widespread reasons of earnest chronic bacterial infections (Aumpan et al., 2023) and it is known as the main agent of chronic gastritis, peptic ulcer, and primary gastric lymphoma (Bardazzi et al., 2020), that eight out of ten cases of gastric cancer have been assigned to it (de Martel et al., 2020). The varied pathologies ascribed to H. pylori infection are caused by the complex interplay of bacterial, host genetics, and environmental agents (Malfertheiner et al., 2023). Along with other modifiable environmental factors, nutrition and nutritional status play an important role in H. pylori infection (Öztekin et al., 2021). During the past years, the consumption of ultra-processed foods (UPFs) has increased dramatically worldwide, replacing healthy dietary patterns (nuts, legumes, vegetables, and fruits) (Leo et al., 2020). These foods are placed in the fourth category of the Nova system in terms of their physical, biological, and chemical characteristics. The categories of the Nova system include 1. Fresh and minimally processed foods, without adding new substances to extend shelf-life (for example milled cereals, meats, eggs, milk, vegetables, nuts, and seeds). Cooking ingredients for use in food preparation (such as salt, vegetable oils, vinegar, butter, and sugar) (Ebrahimi et al., 2024).

A peptic ulcer is a breach in the gastric or duodenal mucosa with penetration of the muscularis mucosa. Small or shallow breaches <5 mm in size are termed 'erosions'; although often insignificant, these can precede frank ulceration (Majumdar, and Looi, 2024). Worldwide, the two most common causes of peptic ulceration are Helicobacter pylori infection and the use of non-steroidal anti-inflammatory drugs (NSAIDs), including aspirin. Other important causes of gastric ulceration are gastric adenocarcinoma and lymphoma; these must be excluded by biopsy and follow-up (Sewilam et al., 2024). Patients

with peptic ulcers are recommended to eat smaller, more frequent meals (for example, six little ones per day), eat slowly, sit up straight after meals, avoid consuming food or liquids two hours before night, and abstain from alcohol. PUD patients may find it helpful to keep a food diary and record their symptoms to keep track of potential triggers that they might eliminate from their die (AL, and Hassan, 2023). The Gastroenterology Endoscopic Department -Al-Kindy Teaching Hospital –Baghdad-Iraq (2019), mentioned that dietary habits play a significant role in the development of gastrointestinal disorders. Also, hot and spicy foods are statistically associated with GI disorders. Fruits and vegetables contain antioxidants, and numerous studies have indicated that they are effective in preventing GI disorders (Shehab, & Abdul-Hassan, and Mahdi, 2021). Over 1 million new cases of gastric cancer and nearly 800,000 deaths occurred in 2020 making H. pylori-related disease the third leading cause of global cancer deaths (Sung et al., 2021). H. pylori infection is designated as an infectious disease and it is recommended that it should be treated regardless of symptoms to prevent serious complications and transmission. The rapid emergence of antibiotic-resistant H. pylori has become the greatest global threat influencing treatment outcomes. For example, almost all World Health Organization (WHO) regions now experience resistance rates to clarithromycin, metronidazole, and levofloxacin of over 15% (Aumpan, & Mahachai, and Vilaichone, 2023).

Prior evidence suggests that diet quality and inflammation may be linked to H. pylori infection. Unhealthy dietary patterns have been associated with a higher risk of H. pylori infection and an increased likelihood of developing H. pylori-related diseases. The dietary inflammatory index (DII) (Wirth et al., 2021). It has been widely used to investigate the association between diet-related inflammation and the risk of infection. Previous studies have demonstrated a positive association between higher DII scores and an increased risk of infectious diseases, including gastrointestinal infections (Xiong et al., 2023). Whereas, the majority of patients with H. pylori infection do not present obvious clinical symptoms in the early stages. Therefore, the identification of risk factors for H. pylori infection can help in early diagnosis and timely treatment. Many studies have suggested that H. pylori infection is associated with socioeconomic status, environmental conditions, and lifestyle habits. A prospective study conducted in an area with a high prevalence of gastric cancer found that annual family income and education level were independent predictors for H. pylori infection (Liao et al., 2023)

Purpose

The systemic review aimed to Relationship between H Pylori Infection, Food Quality, and Peptic Ulcer

The following are specific research objectives

This systematic review set out to compile and analyze all of the existing literature on the topic of H Pylori Infection, Food Quality, and Peptic Ulcer, and then present the findings. The major goal of this evaluation was to assess the state of knowledge about the potential links between H Pylori Infection, Food Quality, and Peptic Ulcer to gather relevant data on this subject.

2. METHODS (SEARCH STRATEGY)

The systematic review helps to discuss and summarize several types of research that have looked at the H Pylori Infection, Food Quality, and Peptic Ulcer. The data search was done using the Web of six electronic databases there are ScienceDirect, EBSCO, PUBMED, BIOMED CENTRAL, CINAHL, and Google Scholar and only the English language was used. PRISMA, an add-on for conducting systematic reviews, was used to search. Also, the relevant terms used to search were identified, and then the searches were conducted based on the research question. The PRISMA guides systematic searches for relevant papers for reviews and meta-analyses. This involves choosing search phrases and databases.

Search Terms

The relevant terms used to search were identified (Table 1), and then the searches were conducted based on the research question. The specific search terms for the database search are listed in the following:

1. The following MeSH terms and words were combined to construct systemic searches: ''H Pylori Infection and Food Quality OR Food Quality and H Pylori Infection OR H Pylori Infection and Peptic Ulcer, OR Peptic Ulcer and H Pylori Infection OR Food Quality and Peptic Ulcer OR Peptic Ulcer and Food Quality AND relation OR Tie OR Association, OR Affiliation OR Bond OR Connection AND H. pylori OR Helicobacter pylori OR Gastric Helicobacter OR Helicobacteriosis AND 'food quality OR Nutritional quality OR Dietary quality OR Food standard OR Food grade OR Food composition OR Nutrient content AND Peptic Ulcer OR Gastric ulcer OR Duodenal ulcer OR Stomach ulcer'. Also, manually searching the reference lists of the included studies and relevant reviews were done to identify additional studies. please see Table 1.

TABLE 1. Search methods

S1	H. pylori [Mesh]
S2	'Helicobacter pylori OR Gastric Helicobacter OR Helicobacteriosis'
S3	'food quality OR Nutritional quality OR Dietary quality'
S4	'relation OR Tie OR Association, OR Affiliation OR Bond OR Connection'
S5	Peptic Ulcer OR Gastric ulcer OR Duodenal ulcer OR Stomach ulcer'

They were used in the search engines that were identified through a series of brainstorming and searching a thesaurus, the database, and preexisting knowledge on the topic. The thesaurus helped in finding and using the control terms to ensure accurate and high-level coherency among the terms. Furthermore, the thesaurus helped control the narrowing and broadening of the search. The search was restricted to the English language. Following the studies' selection, some references in the studies were also selected. Subsequently, the results were screened based on the inclusion and exclusion criteria. These criteria allowed a broad search to be conducted while keeping the scope as precise as possible. the year of publication was restricted from 2010 to 2023. However, the rationale was used to exclude papers in these spread hits to maintain the chain of evidence.

Inclusion Criteria

- Articles related to search terms that influence artificial intelligence and nursing practice.

- Published from 2010 to 2023

- Full-text studies

- English language papers

Exclusion criteria

- scoping reviews.

A total of 19 studies were included in the full-text screening. 16 studies met the inclusion criteria and were incorporated into the study (Figure 2).
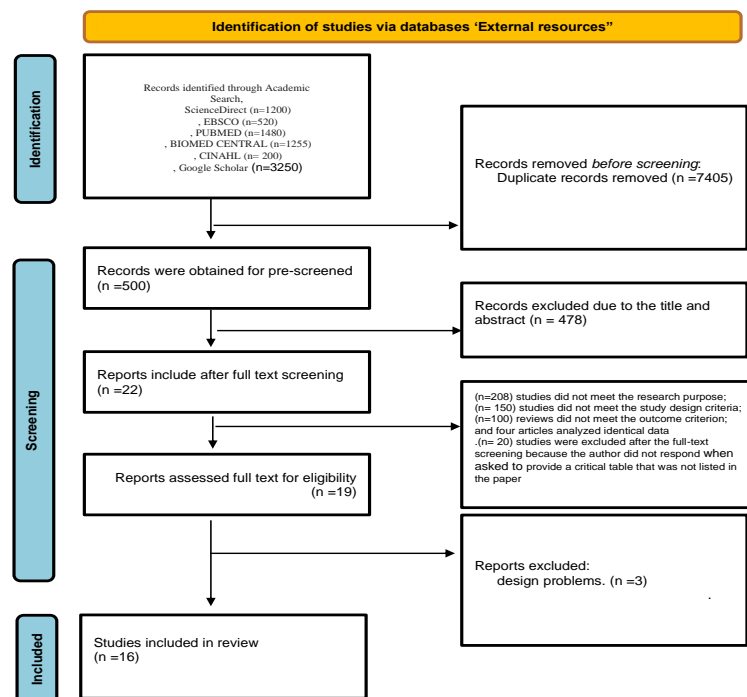
Prisma diagram:

Figure 2. PRISMA tool chart used and designed in this review.

The citation titles and abstracts were independently screened, and potentially relevant articles were fully reviewed after excluding articles that proved irrelevant. An electronic data charting form was developed to determine the most appropriate variables to extract from the articles, and the charting form was continuously updated. Some of the data that were extracted included the general data (the names of the author, country of study, and year of publication), the methodological data (study design, all sample characteristics of the participants, intervention group, control group, outcome measures .and follow-up) as a study matrix designated.

Articles were selected for relevance based on their titles and abstracts, and those that looked promising were read in full. A computer form for making data charts was made to determine the most appropriate variables to extract from the articles, and the charting form was continuously updated. Some of the data that were extracted included the general data (the names of the author, country of study, and year of publication), the methodological data (study design, all samples .characteristics of the participants, intervention group, control group, outcome measures .and follow-up). The findings were organized into the following categories: Prevalence of H. pylori infection among participants, Association between food quality indicators and peptic ulcer development nursing administration, Interaction between H. pylori infection and dietary factors nursing policy, Analysis of dietary factors associated with peptic ulcer development, after which the various themes from the studies were presented and a viable conclusion made.

Eligibility Criteria

All included references were original research with a focus on nursing practice roles performed by artificial intelligence, published in peer-reviewed journals, and delivering "access to health care" as the primary finding. The studies could have used quantitative, qualitative, or mixed methods. Studies were not considered for inclusion if they were in the following categories: editorials, comments, books, policy documents, or government documents; or if they failed to address the responsibilities of nurse practice or artificial intelligence intervention.

Screening

The full-text screening encompassed 500 studies in total. After that, 478 studies were discarded because 208 did not fulfill the research objective; 150 did not adhere to the study design standards; 100 reviews did not satisfy the outcome requirement; and 4 pieces examined the same data. Due to the author's lack of response to the request for a critical table that was not included in the publication, 20 studies were removed following the full-text screening. Figure 2 shows that sixteen papers were finally included in the study since they fulfilled the inclusion criteria.

Data Extraction

Selected studies were charted, compiled, and summarized using narrative tables. According to Putra and Sandhi, (2021), the data charting table was made to help locate commonalities in the research based on the research questions and the goal of the study. Authors, publication dates, samples, designs, the study aims, and results are all part of the data extraction table that was created for specific studies.

3. DATA ANALYSIS

According to Putra and Sandhi, (2021), two writers independently analyzed the data and drew themes and subthemes by summarizing the key findings from the chosen studies. After that, to find the subthemes of the study questions, the writers combined the data analyses and ran joint analyses.

4. RESULTS

Search Results

Table 2: Characteristics of selected studies

Categories	Details	Total	%
Design of studies	Cross-sectional study	6	37.5
	Systematic review	2	12.5
	retrospective data collection	2	12.5
	Prospective study	1	6.25

	Observational study	1	6.25
	Case-control study research design	4	25
Year of publication	2019-2021	8	50
	2022-2024	8	50

Table 2 presents the characteristics of selected studies after the final full-text assessment. The majority of studies are cross-sectional studies, while the remaining articles included quasi-experimental studies, case studies, New innovative research design, bibliometric analysis, Empirical case studies, and retrospective data collection.

Analytical Findings

As seen in Table 3, four components of nursing case management interventions to improve Access to health care were deduced, namely: 1) Prevalence of H. pylori infection among participants, 2) Association between food quality indicators and peptic ulcer development nursing administration, 3) Interaction between H. pylori infection and dietary factors nursing policy, 4) Analysis of dietary factors associated with peptic ulcer development. Table 3 presents a detailed summary of the final studies selected.in Table 3.

Table 3: Themes and subthemes derived from the selected studies

Studies	Components				Issues
	Prevalence of H. pylori infection among participants	Association between food quality indicators and peptic ulcer development nursing administration	Interaction between H. pylori infection and dietary factors nursing policy	Analysis of dietary factors associated with peptic ulcer development.	
Ebrahimi et al., 2024	✓				
Monno et al., 2019	✓				
Niknam et al., 2022	✓				
Shanshal et al., 2022	✓				
Majumdar, and Looi, 2024					
Nekaka et al., 2021	✓				
Saha, & Bakshi, and Mandal, 2020	✓	✓			
Coelho et al., 2018					
Molaoa, 2021		✓			
Malfertheiner et al., 2023		✓			
Kanu, and Soldera, 2024					
Keikha, & Ali-Hassanzadeh, and Karbalaei, 2020		✓			
		✓			
Belay et al., 2020			✓		
Tali et al., 2022			✓		
Vahid, & Rahmani, and Davoodi, 2020					
Yu et al., 2022			✓	✓	
				✓	

Theme 1: Prevalence of H. pylori infection among participants

There are six studies showed the Prevalence of H. pylori infection among participants (Ebrahimi et al., 2024; Monno et al., 2019; Niknam et al., 2022; Shanshal et al., 2022; Majumdar, and Looi, 2024; Nekaka et al., 2021) mention that Helicobacter pylori is the cause of chronic gastritis, peptic ulcer disease, Mucosa-Associated Lymphoid Tissue (MALT lymphoma) and represents the major risk factor for the development of gastric cancer. The burden of H. pylori infection has been recently estimated in the Southern Italian Apulia region. Direct person to person contact by either oral-oral or fecal-oral route is thought to be the most likely mode of transmission of H. pylori. H. pylori antigens are commonly found in the stools of infected patients even if the isolation from human stools has rarely been reported. DNA of H. pylori is found in fecal samples of infected subjects (Monno et al., 2019). The role of *H. pylori* infection in gastric cancers and other gastrointestinal tract diseases has been widely established. Available evidence indicates that diet has an important role in developing *H. pylori* infection. Therefore, protective dietary factors are important from a public health point of view. While some nutritional research has widely focused on single nutrients or foods in diet-disease relations, the overall diet could be more informative because humans typically consume a combination of nutrients and foods (Ebrahimi et al., 2024). The relationship between H. pylori and GERD is a complex and confusing issue due to the influence of various pathophysiological factors between them. One reason for the heterogeneity of the results of previous research to find the true relationship between H. pylori and GERD may be that the design of many studies was only to find a simple relationship between them, whereas, in the final analysis of many of these reports, the effect of confounding factors for this association has not been measured. For instance, The H. pylori infection may make people susceptible to GERD by increasing gastric acid secretion, either directly infecting the gastric-type columnar epithelium or by the action of noxious substances secreted by the infection into refluxed gastric juice (Niknam et al., 2022). Lower educational level and lower monthly incomes were associated with lower physical, mental, and overall QOL scores and these results are in agreement with other studies54. A possible explanation is that spending longer time in education and receiving higher incomes will lead to better living conditions which will positively affect the QOL eventually. Significant differences were found in physical and mental scores between participants who work and those who do not, the higher scores observed in the working patients (Shanshal et al., 2022). Nearly all peptic ulcers are caused by either Helicobacter pylori infection or the use of non-steroidal anti-inflammatory drugs (NSAIDs), including aspirin. As H. pylori infection is becoming less prevalent in developed countries, NSAIDs are an increasingly important cause of ulceration, including ulcers complicated by gastrointestinal (GI) bleeding. Only about 15% of H. pylori-infected individuals develop an ulcer, with the risk determined by the virulence of the H. pylori strain, host genetics, and environment (particularly smoking) (Majumdar, and Looi, 2024). Globally, 50% or more of the world's population is infected with Helicobacter pylori making it the most widely spread bacteria across the world. The low-developed countries are more overburdened by Helicobacter pylori infection than the developed countries. H. pylori infection is associated with duodenal ulcers, chronic atrophic gastritis (CAG), lymphomas, and adenocarcinoma. This study reports the prevalence of H. pylori and its associated factors in Eastern Uganda (Nekaka et al., 2021).

Theme 2: Association between food quality indicators and Peptic ulcer development Nursing Administration

There are Five studies examine the Association between food quality indicators and peptic ulcer development in nursing administration (Saha, & Bakshi, and Mandal, 2020; Coelho et al., 2018; Molaoa, 2021; Malfertheiner et al., 2023; Kanu, and Soldera, 2024) and these studies mentioned that It can produce biofilms and can convert from spiral to coccoid form, which is non-culturable,4and gets transmitted by the oral-oral or oral-fecal route. H. pylori infection was seen more frequently in patients with duodenal ulcers than gastric ulcers5.In the early half of the 20th century, surgery was the only way to treat the patient of peptic ulcer disease. The invention of the H2 Blocker and Proton pump inhibitor dramatically decreases the morbidity and mortality of these diseases. Surgery is now only indicated in peptic perforation cases. An untreated perforated peptic ulcer therefore has a high mortality rate (Saha, & Bakshi, and Mandal, 2020). Infection with Helicobacter pylori (HP) is one of the most common chronic bacterial infections in humans and causes several digestive problems, including chronic gastritis, peptic ulcer, and gastric cancer (GC). As a strategy to optimize the management of this infection in Brazil, three consensus meetings organized by the Brazilian Nucleus for the Study of Helicobacter pylori, recently renamed to Brazilian Nucleus for the Study of Helicobacter pylori and Microbiota (Núcleo Brasileiro para Estudo de Helicobacter pylori e Microbiota-NBEHPM), were held in 1995, 2004, and 2012 (Coelho et al., 2018). Regarding the prevalence of GA and IM which are the necessary changes in the progression of pathological transformation from CG to GC according to Correa's multi-step theory of the evolution of GC, collected data for this study

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demonstrated inconsistent reporting of these pathological changes (GA and IM). Despite the small number of subjects with GA and IM reported in our data, our results demonstrated that the incidence of GA and IM increases with advancing age; and that subjects between the ages of 20–and 30 are not spared of the step-wise progression of the mucosal pathological changes from chronic gastritis, GA to IM (Molaoa, 2021). Infection is formally recognised as an infectious disease, an entity that is now included in the International Classification of Diseases 11th Revision. This in principle leads to the recommendation that all infected patients should receive treatment. In the context of the wide clinical spectrum associated with Helicobacter pylori gastritis, specific issues persist and require regular updates for optimised management. The identification of distinct clinical scenarios, proper testing and adoption of effective strategies for prevention of gastric cancer and other complications are addressed. H. pylori treatment is challenged by the continuously rising antibiotic resistance and demands for susceptibility testing with consideration of novel molecular technologies and careful selection of first-line and rescue therapies (Malfertheiner et al., 2023). *Helicobacter pylori* (*H. pylori*) infects over half the global population, causing gastrointestinal diseases like dyspepsia, gastritis, duodenitis, peptic ulcers, G-MALT lymphoma, and gastric adenocarcinoma. Eradicating *H. pylori* is crucial for treating and preventing these conditions. While conventional proton pump inhibitor (PPI)--based triple therapy is effective, there's growing interest in longer acid suppression therapies. Potassium competitive acid blockers (P-CAB) triple and dual therapy are new regimens for *H. pylori* eradication (Kanu, and Soldera, 2024).

Theme 3: Interaction between H. pylori infection and dietary factors nursing policy

There are three studies examine the Interaction between H. pylori infection and dietary factors in nursing policy (Keikha, & Ali-Hassanzadeh, and Karbalaei, 2020; Belay et al., 2020; Tali et al., 2022) these studies mention that In the gastrointestinal tract, peptic ulcer is induced following damage to mucosa and sub-mucosa tissues, which occurs due to the imbalance between invasive factors (secretion of gastric acid, pepsin, bile salts, increase of oxygen free radicals, consumption of non-steroidal anti-inflammatory drugs, and infection with *H. pylori*) and host defensive mechanisms (mucus, bicarbonate, prostaglandin, antioxidant, and blood circulation) (Keikha, & Ali-Hassanzadeh, and Karbalaei, 2020). *Helicobacter pylori* infection is a global public health problem and associated with chronic gastritis, and strongly linked to peptic ulcer diseases and gastric cancer. The bacterium is endemic in Africa and Asia. Its prevalence is highly variable in relation to geographical area, age, and socioeconomic factors; which is high in developing countries. Globally, different strains of *H. pylori* appear to be associated with differences in virulence, and the resulting interplay with host and environmental factors leads to subsequent differences in the epidemiology of infection (Belay et al., 2020). Several risk factors for coronary heart disease and heart attack has been identified and reported in the literature. These included high blood pressure (BP), high blood cholesterol levels, smoking, alcohol consumption, diabetes, overweight or obesity, lack of physical activity, unhealthy diet, and stress known as modifiable traditional risk factors; getting older, male sex, being postmenopausal, family history of heart disease, and race which cannot be controlled. However, a great percentage of patients with CVD are without these traditional risks (Tali et al., 2022).

Theme 4: Analysis of dietary factors associated with peptic ulcer development.

There are two studies Analysis dietary factors associated with peptic ulcer development (Vahid, & Rahmani, and Davoodi, 2020; Yu et al., 2022) these studies mention that Validation of DAI allows researchers to use this proprietary index to examine a comprehensive aspect of the diet in nutritional assessments and researches. There is limited research on the relationship between the total intake of antioxidants and their serum changes. Most studies on dietary antioxidants and their effect(s) on serum antioxidant levels have examined one or two antioxidants. The interdependent impact of different antioxidants can affect the overall antioxidant levels of serum (Vahid, & Rahmani, and Davoodi, 2020). Composite Dietary Antioxidant Index (CDAI) is a summary score of multiple dietary antioxidants including vitamins A, C and E, manganese, selenium, and zinc that represents an individual's antioxidant profile. The CDAI was developed according to their aggregate effect on anti-inflammation based on markers such as IL-1β and TNF-α,8 both of which are pro-inflammatory and associated with many health outcomes including CRC (Yu et al., 2022).

5. DISCUSSION

Infection with the Helicobacter pylori (H. pylori) bacteria is one of the leading causes of peptic ulcer disease, which impacts millions of people around the globe. The complex pathophysiology of peptic ulcers has recently attracted a lot of interest

due to the interplay between H. pylori infection and dietary variables, namely food quality (Shanshal et al., 2022; Ebrahimi et al., 2024). Multiple investigations have shown that chronic periodontitis contributes to the persistence of stomach H. pylori infection and its subsequent recurrence. There appears to be a reciprocal relationship between these two types of diseases (Niknam et al., 2022). Since more cases of H. pylori were found in the subgingival plaque of periodontitis patients compared to healthy controls, this meta-analysis lends credence to the idea that this bacteria may be associated with chronic periodontal disease (Nekaka et al., 2021; Monno et al., 2019). Nine studies out of nine in our meta-analysis of nineteen studies found no difference in the prevalence of H. pylori infection between cirrhotic patients with and without peptic ulcers (PUs), while ten studies found a weak or positive correlation between the two in cirrhotic livers (Majumdar, and Looi, 2024). Eliminating H. pylori is crucial since it reduces the incidence of gastric adenocarcinoma in high-risk groups, reduces the severity of peptic ulcer recurrence, and is the main therapy for low-grade G-MALT (Saha, & Bakshi, and Mandal, 2020). Coelho et al. (2018) and Molaoa (2021) found that this crucial treatment action prevents more serious and perhaps fatal complications linked to H. pylori infection, in addition to addressing urgent health issues.

 Both the first and subsequent lines of defense against H. pylori infection have traditionally relied on proton pump inhibitor (PPI) regimens. Unfortunately, resistance to clarithromycin and levofloxacin has been on the rise, so these regimens are no longer as effective as they once were. According to Malfertheiner et al. (2022), it is now clear that there is a need for alternative therapies. There is a continuing discussion regarding whether it is practical to test for susceptibility before beginning PPI-based first-line triple therapy, especially in regions with a clarithromycin resistance rate higher than 15%. However, there are logistical and financial hurdles to overcome, especially in developing countries (Shanshal et al., 2022).

A comprehensive review found that peptic ulcers occur in 10% of the world's population, with the same bacterium being identified in 90% to 100% of duodenal ulcers and 60% to 90% of stomach ulcers (Kanu, and Soldera, 2024). However, due to host genetic traits and bacterial virulence factors, the incidence of peptic ulcers in Iran is significantly higher than the global norm. Keikha, Ali-Hassanzadeh, and Karbalaei (2020) also agree that the two primary virulence factors of Helicobacter pylori are surface antigens and cytotoxic enzymes like VacA and CagA. New research has shed light on the complex pathways by which Helicobacter pylori infection causes peptic ulcers. Belay et al. (2020) found that when H. pylori colonizes the gastric mucosa, it causes a local inflammatory response and upsets the delicate balance of gastric acid secretion and mucosal defense systems. This damages the mucosa and makes it easier for ulcers to develop. The formation of ulcers is worsened even more when H. pylori infection is present since it is linked to an increase in stomach acid production and a decrease in mucosal healing (Tali et al., 2022). One method that takes into account the overall quality of the food is dietary indicators like DAI. Some inflammatory disorders, such as gastric cancer, colorectal cancer, obesity, and nonalcoholic fatty liver, have been found to have a strong inverse correlation with DAI (Vahid, & Rahmani, and Davoodi, 2020). We were unable to find any prior research that specifically addressed DAI about H. pylori infection. This study's findings corroborate those of a cross-sectional study that indicated healthy individuals consume far more vitamin C, fruits, and vegetables than those with H. pylori infection. Zinc consumption and vitamin A and E consumption, however, did not differ significantly (Yu et al., 2022).

Implications for Nursing Management and Health Policy

Patients should be educated thoroughly by nurses on H. pylori infection, how it is transmitted, and the link between peptic ulcers and this illness. Patient education on the role of food in the onset and progression of peptic ulcers should take precedence. When patients exhibit symptoms or risk factors for peptic ulcers, nurses should strongly encourage regular screening for H. pylori infection. To find possible triggers and inform individualized care plans, nursing evaluations should include an evaluation of eating habits. Treatment of H. pylori infections and dietary changes are two aspects of tailored care plans, and nurses are vital in their development. Care regimens that are all-encompassing, addressing nutritional needs and promoting ulcer healing, can be achieved via collaboration with dietitians and other healthcare specialists. Consistent monitoring by nurses can help evaluate adherence to therapy, management of symptoms, and dietary compliance.

Limitations of the Systematic Review

To illustrate, the evaluation was data-driven only, even if H. Pylori Infection, Food Quality, and Peptic Ulcer were novel topics in healthcare. Additionally, the quality of the outcomes was not appraised. A decrease in research quality might occur due to the time pressure to provide data. H. pylori infection, food quality, and peptic ulcer consequences are not adequately covered in the scientific and policy literature. Due to many limitations, the results should be regarded with care. Databases

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dedicated to computer science and engineering were not included in this systematic investigation owing to licensing and accessibility issues, which means there may be research gaps. Future nursing evaluations on H. pylori infection, food quality, and peptic ulcer should make use of these datasets. Research not written in English and not combed through in the included studies' citation databases were not considered for this evaluation. Unfortunately, this evaluation probably missed a few key articles because of it.

6. CONCLUSIONS AND RECOMMENDATIONS

A total of sixteen articles were eligible for inclusion in this systematic review. A variety of healthcare settings were examined in the research. In conclusion, our research explores the complex relationship between peptic ulcer development, dietary quality, and H. pylori infection. One of the main causes of peptic ulcer disease is an infection with Helicobacter pylori. It causes ulcers to form when it colonizes the stomach mucosa and throws off the body's natural acid secretion and mucosal defense mechanisms. New studies show that the quality of one's diet significantly affects the risk of developing peptic ulcers, especially in people who have H. pylori infection. We found substantial relationships between dietary patterns and the occurrence of peptic ulcers in the context of H. pylori infection by rigorous analysis of a broad participant pool and assessment of key factors. Further research and action are needed in this area since our results show that dietary variables should be considered as possible modifiers of peptic ulcer risk. Create dietary education programs specifically for people at risk of developing peptic ulcer disease so that they may learn how to make healthier food choices and reduce their chances of ulcers. Reduce your intake of foods that are known to cause ulcers and increase your consumption of healthy foods including fruits, vegetables, whole grains, and lean meats. People who have a history of gastrointestinal issues or who have risk factors for peptic ulcers should be screened for H. pylori infection more often. By promptly identifying and treating H. pylori infections, the occurrence of ulcers and their consequences can be drastically decreased.

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Appendix 1

Literature review Matrix

AUTHOR YEAR	AIM OF THE STUDY	RESEARCH DESIGN	PARTICIPANTS	KEY FINDING AND IMPLICATIONS
Ebrahimi et al., 2024	aimed to investigate the association between the dietary antioxidant index and the risk of H. pylori infection among adults.	case-control study	dietary data of 148 cases and 302 controls	One of the most important risk factors for Helicobacter pylori (H. pylori) infection is nutrition. Balanced diets with high antioxidant properties may have protective effects against the consequences of this infection. In the current study,
Monno et al., 2019	to explore the prevalence of H. pylori infection within a specific population or demographic.	a retrospective study	including a population of 201 *H. pylori* positive patients and 259 H. pylori negative subjects observed at a tertiary referral center in Apulia.	No significant relationship was found between *H. pylori* infection and gender or age, type of employment, working in direct contact with the public, residence, level of education or exposure to pets. No association between *H. pylori* status and the consumption of fish, fruits, legumes, honey, spices, meats, milk and milk products including some typical product of our area was found.
Niknam et al., 2022	The aim of this study was to evaluate the association between helicobacter pylori infection and erosive gastroesophageal reflux disease.	cross-sectional study	In total, 1916 patients were included in this study, of whom	*The association between H. pylori (Helicobacter pylori) infection and gastroesophageal reflux disease (GERD) is a complex and confusing subject.*
Shanshal et al., 2022	This study aimed to assess the QOL in patients with peptic ulcer disease in Mosul city, Iraq.	A cross-sectional study	study was carried out among 385 patients in a public general hospital and 5 local pharmacies in Mosul city during the period from 10th May to 5th August 2021	Peptic ulcer disease (PUD) is a serious chronic medical condition. It is considered one of the most common illnesses worldwide. PUD has its own impact on the patients' quality of life (QOL).
Nekaka et al., 2021	The study aims to identify factors that are associated with H. pylori infection within this population.	cross-sectional investigation	study involving 275 participants was carried out in eastern Uganda	this study found a relatively high prevalence of adverse birth outcomes, with the most frequently reported being miscarriage.
Majumdar, and Looi, 2024	to investigate the relationship between H. pylori infection and the development of peptic ulcers.	case-control study	Younger patients with simple dyspepsia	*H. pylori* infection is becoming less prevalent in developed countries, NSAIDs are an increasingly important cause of ulceration, including ulcers complicated by gastrointestinal (GI) bleeding.
Saha, & Bakshi, and Mandal, 2020	Present study tried to estimate the prevalence of H. pylori infection in those patients and to find out the correlates of H. pylori infection.	observational study	Among the study population, gastric carcinoma was found in the higher age group; whereas peptic perforation was found in the lower age group; the male and female ratio was 2:1 in both groups of patients.	Presence of H. pylori infection was found associated with peptic perforation and gastric carcinoma.
Coelho et al., 2018	to gather experts in the field to discuss and establish consensus-based recommendations regarding various aspects of H. pylori infection management	Cross-sectional study	Patient with peptic ulcer.	Significant progress has been obtained since the III Brazilian Consensus Conference on *H. pylori* infection held in 2012, in Bento Gonçalves, Brazil, and justify a fourth meeting to establish updated guidelines on the current management of *H. pylori* infection.
Molaoa, 2021	The objectives of this study are to determine the prevalence of *H. pylori*, and the incidence of PUD and gastric malignancies among patients who are infected with *H. pylori* or who have the	Retrospective study	adult patients with upper gastro-intestinal symptoms	*H. pylori* infection is associated with both benign and malignant gastrointestinal diseases. However, no studies have been conducted locally describing the prevalence of *H. pylori* and its associated GIT diseases.

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	stigmata of previous exposure to *H. pylori*.			
Malfertheiner et al., 2023	Investigating the prevalence and distribution of H. pylori infection within a population, including factors such as age, gender, geographic location, and socioeconomic status.	case-control study	Patient with infection from *Helicobacter pylori i*	*Helicobacter pylori* infection causes chronic gastritis, which can progress to severe gastroduodenal pathologies, including peptic ulcer, gastric cancer and gastric mucosa-associated lymphoid tissue lymphoma. *H. pylori* is usually transmitted in childhood and persists for life if untreated.
Kanu, and Soldera, 2024	To assess the efficacy of regimens containing P-CABs in eradicating *H. pylori* infection	Systematic review	A total of 256 references were initially retrieved through the search command. Ultimately, fifteen studies (7 RCTs, 7 retrospective observational studies, and 1 comparative unique study) were included, comparing P-CAB triple therapy to PPI triple therapy	*Helicobacter pylori (H. pylori)* infects over half the global population, causing gastrointestinal diseases like dyspepsia, gastritis, duodenitis, peptic ulcers, G-MALT lymphoma, and gastric adenocarcinoma.
Keikha, & Ali-Hassanzadeh, and Karbalaei, 2020	to investigate the potential relationship between specific vacA genotypes of Helicobacter pylori and the development of peptic ulcers specifically within the Iranian population.	Systematic review	In our study, first, 24 original articles containing information on 3328 patients were evaluated.	implementation of the SBL care bundle increased over time in the majority of sites. Implementation was associated with improvements in process outcomes. The reduction in stillbirth rates in participating sites exceeded that reported nationally in the same timeframe. The intervention should be refined to identify women who are most likely to benefit and mini-mise unwarranted intervention.
Belay et al., 2020	This study was aimed to assess seroprevalence of *H. pylori* infection and associated factors among adults' dyspeptic patients in public health facilities of Mizan Aman Town, Southwest Ethiopia.	Cross sectional study	A total of 208 adult dyspeptic patients were included in the study. A structured questionnaire was used to collect data.	elicobacter pylori infection is a public health problem associated with chronic gastritis, peptic ulcer, and gastric cancer. It is endemic in developing countries like Ethiopia.
Tali et al., 2022)	to estimate gestational-age-specific risks of recurrent stillbirth and to evaluate the effect of obstetrical management on perinatal outcome after previous stillbirth.	cross-sectional study	363 consecutive dyspeptic subjects.	Chronic inflammation has been reported as one of the novel coronary heart disease (CHD) risk factors. Knowing that Helicobacter pylori (H. pylori) provokes local inflammation, the relationship between H. pylori infection and cardiovascular disease (CVD) has received considerable attention.
Vahid, & Rahmani, and Davoodi, 2020	The present study aimed to survey the validity of DAI and its association with the odds of GC	based case-control study	82 patients with GC and 95 healthy controls were examined.	The association between dietary antioxidants and GC has been shown in some studies. However, because of the discrepancy between the findings and the lack of a valid indicator, it seems necessary to design and validate the Dietary Antioxidant Index (DAI) to examine the diet's total antioxidant content.
Yu et al., 2022	to investigate the association between a composite dietary antioxidant index and the risk of colorectal cancer within the Singapore Chinese population.	prospective cohort study	61 321 cancer-free participants aged 45 to 74 years at baseline, a food-based CDAI was calculated	Colorectal cancer (CRC) is a major contributor to cancer death globally. Several studies showed some protections by certain individual dietary antioxidants against CRC development. Epidemiologic data on the composite dietary antioxidant index (CDAI) in relation to CRC risk are sparse.