Seroprevalence and determinants of Helicobacter pylori among primary health care centers attendants in AL-Nassiryia city at 2017

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وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ

وَالْمُؤْمِنُونَ ۖ وَسَتُرَدُّونَ إِلَىٰ عَالِمِ الْغَيْبِ

وَالشَّهَادَةِ فَيُنَبِّئُكُمْ بِمَا كُنْتُمْ تَعْمَلُونَ

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DEDICATION

To my mother who spends too much to see us reaching to this stage



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Summary

Over one year starting from the 1st November 2016 to the end of October 2017 , an observational, analytical cross-sectional study through a primary health care centers survey was conducted in Al-Nasiryia city in order to study the prevalence of H.pylori infection among a primary health care attendants, in turn to reflect the extent of H.pylori infection among the general population, other aims were to identify any specific clinical predictors to H.pylori infection to diagnose it regardless the laboratory investigation and to identify the determinants of this infection. A representative sample of 386 individuals including all age groups through multistage sampling had been included in the study . Special form of questionnaire was planned to collect information , which was approved by three experts in the field of community medicine and family medicine before it was used in the collection of the data .

A pilot study was conducted on 20 individuals prior to the proper study in order to test the feasibility of the research , time requirement and the cost . The results were discussed with the supervisor for any change or modification needed . All those 20 individual were included in proper study . Statistical Package for Social Science (SPSS) version (24) was used for data analysis : frequency, percentage , test of significance (Chi-square test , Monte Carlo test, Fisher exact test), correlation and logistic regression analysis had been estimated and p-value of <0.05 was considered as significant.

The overall prevalence of H.pylori infection was 49.48% .The main age affected was more than 65years of male sex(60.2%), divorced(100%), illiterate(56.7%), retired(100%), urban(50.3%), family size > 7 members(53.8%),havingCVD(77.8%). Multivariate analysis showed sex, occupation, CVD, smoking habit, difficulty swallowing to solid food, were significant predictors P-value less than 0.05 and exponential B were 0.343, 0.381, 0.368, 0.401. 0.215, 1.772 respectively, had significant statistical association. Most of studied population having at least Five risk factors , where the accumulation of risk factors does not reflect the positivity of infection. The main limitations in this study were, that could not use stool antigen test in diagnosis which gives us the acute condition of infection because of inconvenience in obtain stool test , also we could not use the urea breath test because it is not available and it was expensive .

Further studies are required specially to estimate the acute cases and their follow up .This study will help in establishing the priorities to act on according the magnitude of the problem and their impact. Also to design the strategies to prevent and control the H.pylori infection .

Key words: H.pylori, Prevalence, H.pylori antibody test, 2017, Thi-Qar

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List of abbreviations

Alp A&Alp B	Double strand nuclear nucleic acid
Bab A&Bab B	Blood antigen binding A&B
Cag A	Cytotoxin associated gene A
CDC	Center of disease control and prevention
CM	Clinical manifestation
DNA	Double strand nuclear nucleic acid
Fla A&Fla B	Flagellin A&B
GERD	Gastro esophageal regurgitation disease
H.pylori	Helicobacter pylori
HDL	High density lipoprotein
HP+ve Ab	Helicobacter positive antibody test
HSP	Henoch-Schonlein purpura
HsP60	Heat-shock protein 60
IDA	Iron deficiency anemia
IHD	Ischemic heart disease
ITP	Idiopathic thrombocytopenic purpura
Lab A	LacdiNA-binding adhesion
LDL	Low density lipoprotein
MALT	Mucosa associated lymphoid tissue
NAP	Neutrophil- activating protein
NSAIDs	Non steroidal anti inflammatory drugs
OR	Odds ratio
PHC	Primary health care center
PMS	Post menopausal syndrome

PYS	Pack year smoking
PCR	Polymerease chain reaction
PPI	Proton pump inhibitor
Sab A	Sialic acid-binding adhesion
USA	United states of America
Vag A	Vaculating cytotoxin A
WHO	World health organization

Chapter one

Introduction and literature review

1.1. Introduction

Helicobactor pylori bacteria(H.pylori) "are spiral-shaped bacteria which grow in the digestive tract and have ability to attach to the gastric mucosa" [1]. H.pylori as organism is helicoidal, curved, or straight gram- negative bacterium 0.5 to 1.0 microM wide and.2 to 4. microM long. There are three species significant human pathogens, which are H.pylori, H. fennelliae, and H. cinaedi.[2]

H.pylori infection is usually harmless, but it can be a major cause of ulcer in stomach and duodenum ,along with gastric cancer and MALT lymphoma, although peptic ulcer and gastric inflammation are the main outcomes.[1]

H.pylori can be classified into three groups, which are the gastric Helicobacter, the entero- hepatic Helicobacter, and the third one species lack sheathed flagella and have elements of an N-linked glycoslation system .[3]

H.pylori incidence and prevalence differed by geography and race. In general H.pylori prevalence is higher in the developing countries than the developed countries . The incidence

of H.pylori infection in developing countries is (3-10%) of the population each year, while in developed countries is (0.5%) [4] . The reasons for these variations involve the socioeconomic differences between population .

The mortality rate to H.pylori infection is not known, but it tends to be minimal, and the mortality is due to complications of infection , such as gastric ulcer, perforation or Mucosa Associated Lymphoid Tissue lymphoma (MALT lymphoma) .H.pylori related gastritis is the main cause of MALT lymphoma onset on gastric mucosa [5].

H.pylori infection is the most common bacterial infection in the world . It infects about one-half of the world population [6] . A positive relationship between age and prevalence of H.pylori infection has been reported in both developed and developing countries. About the gender some studies observed a higher prevalence of H.pylori infection in men than in women . H.pylori seroprevalence have observed and reported among various ethnic and racial groups [7]. For example, in Malaysia, there is increased risk of H.pylori infection in Chinese and Indians and was explained as an ethnic factors [7]. In USA, the H.pylori infection was almost identical between Hispanic and Africans, but significantly higher than that in Caucasians[8].

H.pylori infection and its complications has high economic burden, like treatment with acid-reducing therapy costs $ 11.000, vagotomy costs more than $ 17.000, and antibiotics therapy which takes 17 days costs less than $ 1.000 [9].

The risk factors for H. pylori infection involves age mainly in adult than the children , ethnics and genetics, gender in men higher than the women, interfamilial relation on spreading and increasing the risk of infection. Other risk factors are family size, socioeconomic status, household crowding (sharing beds), diets(nutritional status and types of foods), occupational exposure (nursing staff ,endoscopic staff and sewage workers), water born exposure, personal hygiene and infected sibling.[10]

The prevention of H.pylori infection aimed to eradication, elimination, and decrease the incidence and complications of this infection , this is done by specific strategies for

prevention and control. Premordial prevention is a measure that inhibits the emergence of risk factors in form of environmental, economic, social and behavioral conditions [10]. The primary prevention is all actions that taken prior to the onset of H.pylori infection , which removes the possibility of disease occurrence .It includes health promotion by health education, environmental modification, life style and behavioral changes. Or by specific protection, which includes immunization, chemoprophylaxis, specific nutrients, occupational protects and safety food.

Secondary prevention is to prevent progression and complications of H.pylori infection like peptic ulcer and malignancy , and this is done through arresting infection process by treatment, and protects others in the community. Early diagnosis and treatment play an important role in the prognosis and prevention of occurrence of other secondary cases .

Tertiary prevention is to reduce impairments and disability.[10]

1.2. Rationale

H.pylori infection is the most common chronic infection, and it is effected about half of the world population[6]. Mostly H.pylori infection is silent disease that can developed to serious one with fatal complications, such as peptic ulcer disease, gastric cancer, and MALT lymphoma[5], therefore early detection or screening of H.pylori infection can reduce these complications. There is no systemic study for extent of H.pylori infection in our society . Availability of simple serological test (anti H.pylori antibody test) for H.pylori infection and easily applied , so it can be used for screening.

1.3. Objectives

1. To estimate the extent (prevalence) of H.pylori infection among primary health care (PHCCs) attendants in AL-Nasiriya city .

2. To identify, any possible clinical predictors for H.pylori infection to diagnosed suspect.

3. To identify, any specific determinants related to H.pylori infection .

1.4. Historical Perspective

The presence of spiral bacteria in stomach was reported first time at 1893[11] by Bizzozero(Italian pathologist) who described this spiral bacteria in the canine stomach. At 1896 Salomon reported same findings in stomach of cats and mice[12].

For the first time, spiral bacteria were discovered in human stomach in 1906[13], As a report for patients with gastric tumor .Nine years later, spiral bacteria were discovered in the patients with gastric and duodenal ulcer[14].

In1938,spiral bacteria(spirochetes) were found in 43% of 242autopsied stomach by using a haematoxyline and eosin stain[15]. After one year , spirochetes were reported in 37% of 35 gastric resected specimens from known cases of gastric ulcer or tumor[16].

At 1950,Fitzgerald and Murphy investigated urease in resected stomach from patients with gastric ulcer, they found that urease protected the gastric mucosa by mediating a reaction between urea and hydrogen ions which neutralized gastric acid by production of ammonia[17]. In addition they demonstrated urease to patients with gastric ulcer which leads to neutralizing of gastric acidity.

In 1975,spiral bacteria were reported in association with gastric infection in 80% of gastric resected specimens of patients with gastric ulcer[18]. The gastritis and the bacteria was explained after carbenoxolone- mediated ulcer healing[19]. The role of spiral bacteria in

pathogenesis of ulcer state had been discovered in 1979 when the bacteria described on the luminal surface of epithelial cell of gastric ulcer[20].After three years the bismuth effect on duodenal mucosa in duodenal ulcer was explained [21].

At 1981,Barry Marshal, began a clinical research with Robin Warren (histopathologist in Royal Perth Hospital, Western Australia).Warren took gastric biopsy specimen and stained it with the Warthin-starry stain and noted the mucosal bacteria. Marshall treated a Russian patient with gastritis with tetracycline and see improvement of gastritis [22].

At April 1982,during the Easter weekend, the plates were incubated for 5 days and colonies were visible[23].The association of these bacteria with gastritis discovered at the Royal Australian College of Physicians on 22 October 1982 and published in letter form in1983[24].These bacteria were called, Campylobacter pyloridis,were micro-aerobic,curved,Gram-negative bacteria. The presence of multiple flagella on these bacteria differentiating them from other Campylobacter and the name changed to Campylobacter pylori in 1987[25].

In 1989 a new name was suggested to shown that the Campylobacter pylori did not belong to the genus Campylobacter and were called Helicobacter, reflecting two morphological appearances, helical in-vivo but rod-like in-vitro.

Table:1.1. Summarized main historical events of H.pylori

year	**nomenclature and events of discovery**
1893	Gastric spiral bacteria are reported in the dogs stomach
1906	Spirochetes are reported in the human stomach
1924[26]	Urease activity in the stomach
1950	Urease neutralized gastric acid by produced the ammonia
1975	Spirochetes and gastritis present in 80% of gastric ulcer
1983	Campylobacter organism associated with gastritis and ulceration
1985[27]	Temporal relationship between H.pylori and development of gastritis
1987[28]	Eradication of H.pylori leads to cure of duodenal ulcer
1989[29]	The genus Helicobacter is suggested
1994[30]	H.pylori classified as a grade 1carcinogen
1997[31]	The infection should be eradicated in peptic ulcer

1997	European consensus report on the management of H.pylori

1.5. Literatures review

1.5.1. Definition

H.pylori bacteria" are spiral –shaped bacteria which grow in the digestive tract and have ability to attach to the gastric mucosa[1] .H.pylori infection usually harmless, but they are regarded as a major cause of ulcer in stomach and small intestine". Main diseases which are caused by these bacteria are peptic ulcer and gastric inflammation (gastritis),these bacteria are adapted to live in acidic environment of the stomach by change of the environment around them and reduce the acidity for surviving. The shape of H.pylori allows it to penetrate the gastric mucosa to protect itself by mucus and the immune cell cannot reach it.

H.pylori as organisms are helicoidal,curved,or straight gram-negative bacteria 0.5 to 1.0 microM wide and 2. to 5.o microM long. These organisms are microaerophilic with optimum grown at 37C.[2]

H.pylori can change its membrane at external PH level from 3-7 in order to maintain its neutral internal PH (Vandenplas,1999).

H.pylori remain one of the most common worldwide human infections of upper gastrointestinal conditions which include chronic gastritis, peptic ulcer, and gastric

malignancy. This infection is affected by socioeconomic state ,therefore H.pylori is more common in developing countries than in developed countries. [32] .

1.5.2. Classification

Helicobacter genus belongs to class Epsilonproteobacteria ,order Campylobacterales, family Helicobacteraceae [33].

1.5.2.1. General classification

H.pylori is classified into three groups:

A:The gastric Helicobacter species :colonized in the stomach of human and animals, these species produce urease which converts urea in to ammonia to survive by neutralizing gastric acidity.

B:The entero-hepatic H.species:these infect the intestinal and hepatobiliary tract such as(H.bilis, H.canis, H.cinaedi, H.fennelliae) with clinical manifestations (proctocolitis,gastroenteritis,neonatal meningitis, localized pain and rash, bacteremia), These bacteria can be encountered from blood culture or swabs.[34]

C:The third group of Helicobacter species lack sheathed flagella and have elements of an N-linked glycoslation system[35], such as (H.canadesis, H.pullorum, H.winghamensis). These bacteria can be encountered from feces.[35]

1.5.2.2.The medically important H. species:

1. Helicobacter pylori (H.pylori) : isolated from gastric mucosa of primates and in human in cases of gastritis and peptic ulcer[36].
2. H.cinaedi : isolated from human blood and rectum.[37]
3. H.fennelliae : isolated from human intestine and rectum[37]
4. H.pullorum : isolated from poultry and human with gastroenteritis.[37]
5. H.bizzozeronii :isolated from dogs and human .[38]
6. H.cynogastricus :isolated from gastric mucosa of human and dogs.[39]
7. H.salomonis :isolated from gastric biopsy of dog and human.[40]
8. H.sui :isolated from gastric mucosa of pigs and human .[41]
9. H.felis :isolated from gastric mucosa of cats dogs and human .[42]

10. H.bilis :isolated from colons and caeca of mice and the bile and liver of mice with hepatitis.[43]
11. H.canadensis :isolated from the feces of human .[44]
12. H.heilmanni :isolated from gastric mucosa of cats and human.[45]
13. H.ganmani :isolated from caeca,large bowels, small bowels and liver of mice. [46]
14. H.canis : isolated from feces of human and domestic dogs. [47]

1.5.3. Pathophysiology

1.5.3.1. Micro-pathophysiology

H.pylori is a motile ,flagellated ,gram-negative, spiral bacteria[48].which can survive in the acid environment of the stomach by producing the enzyme urease[49].H.pylori is not invasive ,but colonized in the human gastric mucosa ,these bacteria released pathogenic proteins that induced cell injury and inflammation [50].

H.pylori pathogenesis and disorder outcomes are mediated by interaction between bacterial virulence factors, host, and environmental factors. After entering H.pylori to the host stomach, it will pass through four steps to establish successful colonization and illness pathogenesis[51] :

Step1: Urease and survival in acidic stomach

H.pylori has developed an acid adaptation mechanism that promotes of periplasmic PH in the acidic environment of the stomach by regulating urease activity . Urease is found on the H.pylori surface due to lysis of some organisms.[51]

Extracellular urease acts to break down urea into carbon dioxide and ammonia, and ammonium hydroxide will be produced when ammonia combined with water .Therefore H.pylori can safely pass through the gastric juice when ammonium hydroxide neutralized the acidic environment close to the bacteria[52]. In addition to that,urease can regulate H.pylori –macrophage interactions for survival[53].

Step2:Flagella and movement toward epithelial cell

H.pylori moves through the gastric mucosa epithelium layer to the basal layer ,where the PH level at 7.0 by the action of 4-7 sheathed flagella . Infected patient with higher motility H.pylori may show density in the upper stomach[54]. H.pylori flagella composed of basal body ,hook, and flagellar filament.[55]

The basal body composed of several proteins structures that are providing the energy source for motility .Hook is composed of flagellin(protein) called FlagE which links the basal body and flagellar filament. The flagellar filament consist of two flagellins (FlaA and FlaB).[55]

Step3:Adhesins and attachment to cellular surface receptors

After H.pylori colonized on the mucosal layer of gastric epithelium ,the interaction of bacterial adhesions(proteins) with cellular receptors protects the bacteria from displacement from the stomach due to peristalsis and gastric emptying ,then the bacteria get nutrients to grow through realsing toxins to damage the host cells.[56].

There are several types of adhesions :

1. blood-antigen binding protein A (BabA) .[56]
2. blood-antigen binding proteinB (BabB) [57]
3. sialic acid-binding adhesion (SabA) [57]
4. neutrophil-activating protein (NAP) [58]
5. heat shock protein 60 (Hsp60) [59]
6. adherance-associated protein (AlpA, AlpB) [60]
7. H.pylori outer membrane protein (Hopz)[61]
8. LacdiNAc-binding adhesion (LabA)[62]

Step4:Toxin and host tissue damage

1. Cytotoxin-associated gene A (CagA):

Several studies indicated that the CagA-positive strain are directly associated with acute gastritis, gastric ulcer, and gastric cancer development.[63].As a result, the virulence of

H.pylori has been measured by their ability to produce CagA.This toxin divided into the Western-type CagA and the East Asian-type CagA. The East Asian type induced more cytoskeleton changes, and more likely to be associated with gastric cancer[64].

2.Vacuolating cytotoxin A (VacA):

This toxin can establish into the host membrane and also has the characteristic of an anion-selection channel, this channel can release bicarbonate and organic anions in the host cytoplasm[65].In this way , the channel help H.pylori colonization by allowing the passage of potential metabolic substrates for bacterial growth.

1.5.3.2. Clinical pathophysiology

H.pylori is a bacterium that affects the risk of developing various clinical disorders.

1.5.3.2.1. Gastrointestinal disorders:

1. Acute and chronic gastritis : H. pylori infection always causes gastritis(usually asymptomatic) , which is a superficial process and affects the antrum. Acute gastritis is characterized by neutrophilic infiltration .The acute infection is asymptomatic for that we cannot recognized it, but if it is investigated can seen intense inflammation by mucosal edema, hyperemia and neutrophilic infiltration. The acid –inhibitory factor has been shown to inhibit acid secretion in animal gastric gland in vitro [66]. In chronic gastritis ,there is infiltrations with mononuclear cell, lymphocytes and plasma cells, it is developed from untreated acute infection . After eradication of H. pylori , neutrophils disappear rapidly and lymphocytes and plasma cells disappear by one year.
2. Peptic ulcer disease : The association between H.pylori and peptic ulcer can explain through three facts. **First**, most of patients with peptic ulcer and who are taking (NSAIDS) drugs are infected with H.pylori**. Second**,H.pylori can be detected before occurrence of peptic ulcer ,therefore it is regarded as a risk factor to ulceration [67]. **Third**, the eradication of H.pylori results in ulcer healing and decrease the recurrence rates [68].
3. Gastric cancer : The gastric cancer remains the second leading cause of cancer deaths worldwide. There is a strong association between gastric cancer and H.pylori infection

,through many environmental and host factors ,that play a role in the pathogenesis of gastric cancer .These factors includes vitamin C content of gastric juice, reactive oxygen metabolites, and epithelial cell proliferation. In 1994, the international Agency for Research on Cancer, a working part of the World Health Organization, classified H.pylori as a type I carcinogen [69]. Longitudinal studies suggested that the gastric cancer developed in stepwise pattern from chronic active gastritis to multi-focal atrophic gastritis to intestinal metaplasia to dysplasia to adenocarcinoma[70].Other mechanism includes the release of reactive oxygen metabolites that cause damage to DNA.Another type of malignancy is gastric lymphoma which also inflicted by H.pylori infection which leads to lymphoid follicle formation, and the diagnosis need a high index of suspicion.

Mucosa- Associated Lymphoid Tissue Lymphoma (MALT),it is believed that MALT is an immunological defense system to control local infection caused by H.pylori[71]

4. Colorectal adenoma and carcinoma : colorectal cancer has common risk factors like H.pylori infection[72].The role of H. pylori in colorectal carcinogenesis has been widely examined ,but the association remains unclear .A meta-analysis showed that the H.pylori infection is associated with increased risk of colorectal adenoma(OR=1.66) and colorectal cancer(OR=1.39).[73]

1.5.3.2.2. Hepatobiliary disease:

Helicobacter DNA has been detected in hepatic tissue from patients with hepatobiliary diseases(hepatitis C virus, liver cirrhosis, and hepatocellular carcinoma[74]. The odds ratio for H.pylori infection with risk of hepatocellular carcinoma was 13.63 [75].

1.5.3.2.3.Respiratory tract diseases :

1. Lung cancer: The results of previous studies of H.pylori seropositive and lung cancer are inconclusive [76].

2. Laryngeal cancer: The risk of laryngeal cancer with H.pylori infection was explained by Meta-analysis which showed a 2.03-fold increased risk [77].The presence of the cagA gene in the larynx cancer tissue leads to decreased survival rate and increased recurrence [78].

1.5.3.2.4Cardiovascular diseases:

A high prevalence of cagA gene H.pylori was reported in patients with ischemic heart disease , unstable angina , acute myocardial infarction, and essential hypertension [79].Evidence on relationship between H.pylori infection and IHD is weak.

1.5.3.2.5.Dermatological diseases:

H.pylori eradication in patients with chronic urticaria leads to symptomatic relieve in some patients while others not relieve [80].

1.5.3.2.6.Hematological diseases:

1. Immune thrombocytopenic purpura: The prevalence of H.pylori infection in patients with (ITP)is higher than that in age and gender [81]. The eradication of H.pylori leads to increased platelet count at least half of infected ITP patients [82]. European Helicobacter Study Group consensus in 2012 and the second Asia-Pacific Consensus Guidelines have recommended H.pylori eradication in patients with chronic ITP [83].
2. Henoch-Schonlein purpura (HSP): A study in China found ,abdominal HSP may be associated with H.pylori infection (OR=4.62),this leads to screening of H.pylori infection in children with HSP with gastrointestinal manifestations [84]
3. Iron deficiency anemia (IDA): several studies have shown low ferritin level among patients with H.pylori infection .Meta-analysis showed an association between H.pylori infection and iron deficiency anemia [85].H.pylori eradication improves iron absorption [86].

1.5.3.2.7.Insulin resistance and metabolic syndrome:

Many epidemiological studies showed strong association with metabolic syndrome (OR=1.39) [87],also there is significant association with high systolic blood pressure, low(HDL),low cholesterol level, and high (LDL) [88].H.pylori eradication can leads to an improvement of lipid profile and insulin resistance through decrease C-reactive protein level [89].

1.5.3.2.8.Clinical benefits of H.pylori infection :

1. Gastroesophageal reflux: Eradication of H.pylori infection may be a risk factor for development of (GERD) [90]. The Maastricht consensus IV confirmed a negative association between the prevalence of H.pylori and severity of (GERD).

2. Bronchial asthma: H.pylori infection may have an effect on developing immune system ,which may reduce the risk of asthma in later life [91].

1.5.4. Epidemiology

1.5.4.1. Incidence & prevalence: H.pylori prevalence and incidence differed by geography and race. The prevalence rate means the total number of people that have a disease at a given time, while incidence rate mean the new infections of a disease. In general H.pylori prevalence is higher in the developing countries than the developed countries. The incidence of H.pylori in developing countries is 3-10% of the population each year while in developed countries is 0.5% [92].The reasons for these variation involve socioeconomic differences between population .

At least half of world's population are infected by H.pylori ,making it the most widespread infection in the world [93].In developing countries ,H.pylori infection at the first 5 years of the life and remain high, so the H.pylori is acquired early in childhood [94].

The Middle East is an intermediate prevalent region regarding stomach cancer, the rate of H.pylori infection in this region is high [95]. We will take example for the prevalence of h.pylori infection among the general population in some countries :

1. Iran: The H.pylori infection is very high in Iranian general population [96]. There are many studies performed in various regions in Iran(table below)

Table 1.2. prevalence of H.pylori among Iranian cities

Region	Type of test	Prevalence
Ardabil [97]	Histopathology	90%
Tehran [98]	Serology	69%
Babol [99]	Urease breath test	78% for men
Rasht [100]	Serology	83.6%
Rafsanjan[101]	Serology	72% for men
Nahavand[102]	Serology	71%
Golestan [103]	Serology	66.8%

❖ **Prepared by researcher**

2. Turkey:The rate of H.pylori infection in Turkey also high. Across-sectional study showed the rate of infection with seropositivity rates of 58.4% [104].
3. Saudi Arabia: General population studies in two major cities ,Saudi Arabia were in Mecca 51% [105],and in Medina was 28.3% [106] .

4. Jordan: in 250 patients with abdominal pain ,epigastric pain,vomting or heartburn was 44% by PCR test. [107] .
5. Kuwait: In 204 symptomatic patients with gastrointestinal symptoms, H.pylori infection rate was 96.6% of the patients [108].
6. Oman: General population study : the rate of infection was 69.5% by serological test [109].
7. United Arab Emirates: A prospective study for 151 participants showed seropositivity was 74.2% [109].
8. Yemen: In dyspeptic patients was 75% by serology [110].
9. Morocco: In symptomatic patients in rural areas was 69.9% by endoscopic biopsy [111].
10. Palestine: General population : A study on 89 people from Ghaza,the H.pylori positive rate was 48.3% [112].
11. Egypt: A 605 people were screened for anti-H.pylori antibodies and the seropositivity rate was 91.7% ,the rate changed with age and tend to be increased with older ages [113].
12. Libya: A 360 asymptomatic people aged from 1 year to 70 year investigated serologically ,the prevalence rate was 76% [114].
13. Bahrain: In 57 symptomatic patients with dyspepsia the prevalence rate was 100% [115.
14. Lebanon: In children :414 children aged from 1 month to 17 years the prevalence of H.pylori infection was 21% by stool antigen test [116].
15. Tunisia: In children :191 healthy child investigated serologically the rate was 30.4% [117]

1.5.4.2. Mortality & Morbidity

Mortality rate: The mortality rate of H.pylori infection is not known, but it tends to be minimal. Mortality is due to complications of infection , such as gastric ulcer perforation or MALT lymphoma of gastrointestinal tract . [5]

The relationship between H.pylori infection and perforated peptic ulcer can be explained by the pathophysiological behavior of H.pylori, which is released of cytokinase,lipopolysaccharide,heat-shock protein enzymes ,which leads to inflammatory process and this causes mucosal damage and ulceration. Recent studies using histopathology of H.pylori detection showned that the prevalence of H.pylori in patients with perforated duodenal ulcer ranges from 50%- 80% [118].Recurrent peptic ulcer mainly occurs in patients with H.pylori infection ,so H.pylori plays important role in development and complication of peptic ulcer [119].

Another aspect of mortality of H.pylori infection is Mucosa-Associated Lymphoid Tissue lymphoma (MALT).H.pylori related gastritis is the main cause of MALT lymphoma onset on gastric mucosa [120],for that development of (MALT) in gastric mucosa may be regarded as a pathognomic sign of H.pylori infection. Each infected patient is at a risk of developing gastric MALT lymphoma during a lifelong infection. By culturing lymphocytes isolated from gastric MALT-lymphoma and inactivated H.pylori strains, detected proliferation of B-cell [121], from gastric cancer and peptic ulcer disease ,virulent factors of H.pylori play a role in the pathogenesis of gastric lymphoma [122].

1.5.4.3. Distribution

H.pylori is the most common bacterial infection in the world. It is infected about one-half of the world's population [123],and its distribution depend on many determinants :

1. Age: The effect of age on the prevalence of H.pylori is one of the best documented factors .A positive relationship between age and prevalence of H.pylori has been reported in both developed and developing countries [124], for that the prevalence of H.pylori infection become higher in adults than in children.

2. Gender:some studies observed a higher prevalence of H.pylori in men than in women [125],and other studies found no relation between gender and prevalence of H.pylori infection[126].

3. Ethenic and genetic factors: H.pylori seroprevalence have observed and reported among various ethnic and racial groups [126]. For example, in Malaysia, there is increased in the risk of H.pylori infection in Chinese and Indians was suggested as an ethnic genetics factors [126]. In USA ,the prevalence of H.pylori was almost identical between Hispanic and Africans Americans, but significantly higher than that among Caucasians [127]. Also a study of monozygotic and dizygotic twins suggested that the genetic factors may have some influence on the incidence of H.pylori infection [128].

4. Geographical distribution: the prevalence of H. pylori shows large geographical variation. In developing countries more than 80% of the population is infected with H.pylori[129], while in developed countries the prevalence is under 40%[130]. Within the

geographical areas, the prevalence effected by the socioeconomic status and living conditions during childhood[131].

In developing countries, H.pylori infection rates rise rapidly in the first 5 years of the life and remain high, while in developed countries the prevalence is low in childhood and slowly rising within the age.

The active elimination of H.pylori from the population and improved hygiene and housing condition have effect on lowering the rate of infection.

1.5.4.4.: Economic burden

According to CDC (centers of disease control and prevention).

* Peptic ulcer disease and H.pylori infection on U.S. health care system: One from each ten Americans suffered from peptic ulcer during their lifetime, ulcer estimated 1 million hospitalizations and 6500 deaths per year. In U.S. the annual health care costs of peptic ulcer estimated at nearly $6 billion ($3 billion in hospitalization,$2 billion in physician visits,$1 billion in decrease productivity and day lost from work) [132].

* Antibiotics therapy has a much greater effect on lowering the overall cost of peptic ulcer disease: Curing of an ulcer with antibiotics takes less time and costs less than one-tenth the amount of treating ulcer symptoms over a lifetime, treatment with acid-reducing therapy costs $11,000, vagotomy is more extreme treatment costs $17,000, antibiotics therapy takes 17 days and costs less than $1,000. [133].

*Curing of an ulcer with antibiotics is cost-effective : Nine from each ten peptic ulcer are caused by H.pylori bacterium and not by stress or spicy food. Treatment of H.pylori infection with antibiotics decreases the ulcer healing time and reduces the ulcer recurrence rate .H.pylori infection cured with two weeks regime of antibiotics.[134].

*Antibiotics therapy is cost effective in managed care setting: Eradication of H.pylori from patients with peptic ulcer results in decrease health care cost, outpatients services and cost of follow-up care [135].

CDC is working to reduce the economic burden of peptic ulcer through health education by explained the relationship of H.pylori and peptic ulcer ,a awareness of this relationship will result in improved diagnosis and treatment of peptic ulcer and this will leads to decreased health care use and cost.

1.5.4.5. Determinants

1.Age: H.pylori infection is found to be higher in adults than the children.[136]

2. Ethnic and genetic factor: H.pylori infection seroprevalence had been observed and reported among various ethnic and racial groups[137] ,for example in Malaysia the risk of H.pylori infection in Chinese and Indians was suggested as an inherited ethnic genetic predisposition.[138]

3.Gender: H.pylori infection is higher in men than in women.[139]

4. Interfamilial relation: Many studies reported an effect of interfamilial relation on spreading and increasing the risk of H.pylori infection[140]. Mother-to-child transmission is the single most probable cause of the interfamilial spreading of H.pylori infection [140].Family size has been shown affect on H.pylori infection incidence, which increase according to the number of children per household [141].

5.Socioeconomic factors: Socioeconomic status is one of the most important factors that affect the spreading of H.pylori infection[142].For this we found high prevalence of H.pylori in developing countries, and lower prevalence in developed countries according to the socioeconomic level.

In USA classified children in to five social classes. The prevalence of H.pylori infection was 82% in the lowest class,52% in the two middle class, and 11%in the two high class[143].

The socioeconomic status is not restricted to the income and social class, but takes in consideration other factors including living standard, sanitation, urbanization and educational level[144] all these factors caused increasing in the rate of H.pylori infection.

6.Crowding: Household crowding, sharing a bed and increasing household contact are risk factors to H.pylori infection[145].

7.Diet : Many studies are curried out to detect any association between diet and H.pylori infection, and covered many different types of population and include both adults and children. Some of these studies suggested that the nutritional status may be related to H.pylori infection. Goodman[146] and Fontham[147] found significant reduced odds ratios and negative gradients in the risk of H.pylori infection with increased consumption of fruits and/or vegetables.

8.Occupational exposure: Several researchers found there is association between certain occupations and prevalence of H.pylori infection, from these occupations which have higher rates of seropositivity among employees such as nursing staff ,medical staff,[148] endoscopy staff and sewage workers[149].

9.Waterborne exposure: Water has suggested as a possible source of H.pylori infection. Three waterborne factors were linked to higher risk of H.pylori infection in Colombian children : drinking water from stream, swimming in stream and swimming in swimming pool [150].

10.Personal hygiene: Poor hygiene ,especially during childhood appears to be related to a higher risk of H.pylori infection. Some of these hygiene's include having no water closet or bathroom or no hot water supply in the house, sharing cups as children ,mothers who did not use soap when they washed their hands ,mother prechew the food for their young children ,using of chopsticks, not washing hands after use of toilet and living in small area with limited sanitary facilities [151].Other hygiene's during adulthood, such as sharing a toothbrush or cup and toilet /bathroom facility[152].

11.Infected siblings: Several studies supported that the infected sibling as a risk factor for H.pylori infection [153].

1.5.5. Mode of transmission:

1)**Person-to-person transmission**: these include many types of spreading ,such as oral-oral ,fecal-oral, gastro-oral routes. The oral cavity has been proposed as a reservoir of infection ,some studies have shown isolation of H.pylori from oral specimens ,particularly dental plaque[154]. H.pylori has been found in oral mucosal ulcer. Recent studies by several

investigations have detected H.pylori DNA in saliva in positive H.pylori subjects by using PCR assays[155].

Fecal-oral route is another possible route of transmission and H.pylori DNA are detected in the feces of infected subjects[156].

2)**Waterborne transmission**: H.pylori can live for several days in milk and tap water in its infectious bacillary form[157] and in the river water for several months in coccoid form[158].

3)**zoonotic or vector borne transmission**: H.pylori has been isolated from non human primates and domestic cats [159],also shown to infect monkeys [159]. H.pylori can be transmitted from cats to humans by saliva, vomit or feces. A study in Germany by Rothenbacher [160] found that adult who owned a cat as a child had a significantly higher prevalence of H.pylori infection. In a study of children from Colombian Andes, reported that children who played with sheep had a higher prevalence of H.pylori infection (OR=4.5) [161]. H.pylori DNA was detected in raw sheep milk [162] .The most recent reservoir suggested for H.pylori transmission is the housefly ,especially in the rural area and agricultural area [163]. The flies can transmit H.pylori from contaminated feces to the food which indirect transmission .

4**) Iatrogenic or fomites transmission**: Endoscopy is a common medical procedure used to diagnose and manage gastrointestinal disease, and it is regarded a common route of transmission to the H.pylori infection. Outbreaks of achlohydria in the USA, and acute mucosal lesion in Japan are examples of iatrogenic H.pylori infection transmitted either by endoscope or by gastric fluid [164].

1.5.6. Diagnosis

1.5.6.1. Clinical features

*** Symptoms**: H.pylori infection can cause many different symptoms , which are different from person to person[165] .

a) Heartburn or acid reflux .

b)Diarrhea, constipation ,flatulence ,bloating . These symptoms because H.pylori interferes with acid in stomach and effects on digest food.

c) Nausea and vomiting .

d) Abdominal pain and/ or discomfort .

e)Dark or tar-like stool.

f) Full feeling after a small amount of food (early satiety) and decrease appetite.

g) Fatigue and low energy levels. These symptoms due to effects of H.pylori on digestion ,which prevents body from getting the correct nourishment to maintain its proper energy level.

h) Weight and muscle loss. Due to effects on the digestive process of fats and proteins.

i) Hormonal symptoms including mood swings and PMS (post menopausal syndrome). These are caused by an over production of cortisol due to stress of the body trying to deal with infections.

j) Depression and anxiety . due to effects on serotonin which is largely made in digestive system .

k) Gum disease , bad breath and oral infections. Because H.pylori found in the mouth and dental cavities.

l) Blocked nose, painful sinuses, colds and infections. Because connection of sinuses to the digestive system.

Less common symptoms include tension headache clouded, thinking , cramping, joints pain , painful lymph nodes and general body aches.

* **Physical signs**: No specific clinical signs in patients with H.pylori infection , patient may feel dyspepsia or abdominal discomfort or signs of H.pylori complication such as peptic ulcer.

1.5.6.2. Investigation

1. Invasive testing: it consist of an upper gastrointestinal endoscopy and biopsy followed by culture, rapid urease testing, and histopathology[166].

Table 1.3. Invasive laboratory test

Method	Sensitivity (%)	Specificity (%)
Histology	>95 very good	>95 very good
Culture	64 not good	100 very good
Rapid urease test	95 very good	85 very good

❖ Prepared by researcher

2. Noninvasive test : it is include the following as in a table

Table 1.4. Noninvasive laboratory test

Method	Sensitivity (%)	Specificity (%)
Urea breath test	>95	>95
Serology(ELISA)	85	79
Stool Ag test	>90	>90
Saliva	71-93	82-92
Urine (IgG)	85	79

❖ Prepared by researcher

Treatment :

1. 1st line treatment: PPI-clarithromycin –amoxicillin/ metronidazole from 7 to 10 days.

2. 2nd line treatment : PPI-bismuth-amoxicillin or PPI-levofloxacin-amoxicillin for 10 days.

3. 3rd line treatment : after failure of two lines treatment need for culture by gastric biopsy or used PPI-rifabutin**.** [167]

1.5.7. Prevention and control strategies:[168]

1. Good hygiene and hand washing , especially with food preparation.

2. All patients with chronic gastrointestinal symptoms that may be associated with H.pylori infection should be tested and treated to prevent exposure to family members .
3. Patients should complete the full course of therapy (antibiotics and acid blockers).
4. Maintain proper nutrition to prevent iron deficiency anemia .
5. Increase vegetable intake like (cauliflower, cabbage, broccoli).
6. Support policies to improve living conditions in developing countries .
7. Human vaccines against H.pylori infections are in early stages of clinical trials.
8. Health education about the risk factors, mode of transmission, and clinical manifestation of H.pylori infection.

1.5.7.1. Prevention

it is aimed to eradication, elimination and decease the incidence and complication (disability) of H.pylori infection.

a) **Primordial prevention:** it is a measures that inhibit the emergence of risk factors in form of environmental, economic, social and behavioral conditions .[169]
b) **Primary prevention :** it is all actions that taken prior to the onset of infection, which leads to removes the possibility of disease occurrence . it is including :

*Health promotion: by health education, environmental modification, life style and behavioral changes .

*Specific protection : by immunization, chemoprophylaxis, use of specific nutrients, occupational protects and safety food .[170]

c) **Secondary prevention :** it is to prevent progression and complications of H.pylori infection ,this done through arrest infection process by treatment, and protects others from in the community. [170]
d) **Early diagnosis and treatment** which is important for prognosis and prevention of occurrence of other secondary cases.
e) **Tertiary prevention:** it all measures available to reduce impairments and disability .

1.5.7.2. Control:" operations that aimed to reduce" :[168]

- The incidence of H.pylori infection.
- The duration of H.pylori infection .

- ❖ The effects of infection , including both physical and psychological complication
- ❖ The financial burden to the community .

The control including the following procedures :

A. H.pylori Elimination : it means interruption of transmission of disease .
B. H.pylori Eradication :it is "termination of all transmission of infection by extermination of the infectious agent through surveillance and containment".
C. Monitoring :it is "the performance and analysis of routine measurements aimed at detecting changes in the environment or health status of population .
D. Surveillance : it defined as "the continuous inspection of the factors that determine the occurrence and distribution of H.pylori infection and other conditions of ill-health".

1.5.8. Complications:[171]

1. chronic active gastritis : it is the primary disorder associated with H.pylori infection .
2. Peptic ulcer disease : it is involved both gastric and duodenal ulcer ,95% of duodenal ulcer patient and 80% of gastric ulcer patient are infected with H.pylori infection [172].
3. Gastric cancer :the risk of cancer in the presence of H.pylori depends on the severity of gastritis and risk of atrophic gastritis.
4. Gastric MALT lymphoma .
5. Esophageal cancer .
6. Obstruction : which can happen when an ulcer blocks the food from leaving stomach .
7. Peritonitis .
8. Idiopathic thrombocytopenic purpura (ITP).

1.5.9. Prognosis

The prognosis for treatment and eradication of H.pylori infection is excellent, even with the complications , such as gastric MALT lymphoma and become poor prognosis for patient with gastric and esophageal cancer.

The re-infection is very low (1-2%) , children and females have a high incidence of re-infection (5-8%). [173]

Chapter two

2.1. Subjects and Methods

2.1.1. Profile of study area

AL-Nasiriya city is located in the southeast of Iraq .Thi-Qar governorate shares internal boundaries with governorate of Basra from south, Wassit from north, Missan from west, and Muthanna from east.

AL-Nasiriya city intersected by the Euphrates river into two unequal areas, AL-Shamiah area to the south of river and AL-Jazeera area to the north. Marshlands stretches from west of governorate, and shares with adjacent governorates of Basrs and Missan. After the 1991, the Ba'ath regime constructed a many dams and canals aiming to drain the marshlands, and this leads to decreasing water level of Tigris and Euphrates rivers, the draining also increased the level of salt in both the soil and water in this area.

Thi-Qar governorate has a dry climate, and the summer is hot and dry with average high temperature reach above 40C, while winter is mild. The governorate population estimated about (1,742,852), gender distribution is 52% males and 48% females, geographical distribution is 62.9% urban and 37.1% rural .

The governorate of Thi-Qar is divided into five districts : AL-Chibaysih, AL-Nasiriya, AL-Rifa'i, AL-Shatra, and Suq-AL-Shuyukh. Also the governorate has a number of oil refineries, and two universities , one located in the governorate capital of AL-Nasiriya and the 2nd located in AL-Rifa'I district.[174]

The health facilities in AL-Nasiriya city include one big hospital (500) beds, one maternity and pediatrics hospital, cardiology center, endocrine center, thalassemia center, and 21 primary health care centers.

2.1.2. The study population

The study had been carried out among PHC attendants in AL-Nasiriya city which is the capital of Thi_qar governorate .The study population includes both sexes (male and female) and all age groups. The exclusion criteria include those who refused H.pylori antibody test; those who were on PPI in last 2 weeks or on H2 receptor blockers in last 3 days or antibiotics in last 10 days and those who have gastric surgery or gastric tumor . Age was estimated according to individual identification card or from same participants or his relatives .

2.1.3. The study design

The study is observational ,analytical ,cross sectional survey. The period of study started from first week of November 2016 to the last week November 2017.

This study design had been chosen for the following reasons:-

- ❖ The study is descriptive, often in the form of a study and the aim is to describe a general population.
- ❖ Estimate the prevalence of H.pylori infection for the general population at a given time point.

The advantages of cross-sectional study are :

1. Relatively inexpensive and takes up little time to conduct.
2. Can estimate the prevalence of outcome (H.pylori infection) because sample is usually taken from the whole population .
3. Many outcomes and risk factors can be assessed.
4. Useful for public health planning, understanding disease aetiology and for the generation of hypotheses.
5. There is no loss to follow-up.

2.1.4. Sample and sampling process

A-Sample size

it was calculated by the following formula

Dobson formula [175]

$$N = \frac{(1.96)2 \times p\,(1-p)}{d\,2}$$

N= sample size

P= prevalence rate which is 50% [176]

d= maximum tolerated error, the value of 0.05

$$N = \frac{(1.96)2 \times 0.5 \times 0.5}{(0.05)2} = \frac{0.9604}{0.0025} = 384.16$$

B- Sampling procedure

AL-Nasiriya city is divided by Thi-qar health Directorate into two PHC sectors ;1st AL-Nasiriya sector in AL-shamia- area to the south of river which subdivided into six PHC and 2nd AL-Nasiriya sector in AL-jazeera area to the north of river which sub divided into 14 PHC center.

Multistage sampling method had been performed. In the first stage ,after mentioning the percentage of each PHC sector to the total population of AL-Nasiriya city by sample fractioning, which in 1st AL-Nasiriya sector (AL-shamia area) about 26.25% and in 2nd AL-Nasiriya sector (AL-jezeera area) about 73.75% then will calculated the sample fraction for each PHC center.

In the second stage a systematic random sampling conducted for PHC attendants .

At the beginning the researcher introduced himself to the respondent and then permission had been taken to participate in the study and explain the aims of this study.

The researcher and assistants trained on data collection .Then we checked data three times :

1. At the morning before leaving home
2. At the end of the day
3. At the end of the week

Table 2.1 : Distribution of the target population to the 2nd AL-Nasiriya sector

PHC center	Total population	%	Final sample
AL-Shaheed M. Kasm	24994	4.49 %	**17**
AL-Sumer	33035	5.93 %	**23**
AL-Habboby	14507	2.60 %	**10**
AL-Rhaazi	31632	5.68 %	**22**
AL-Fidaa	18521	3.32 %	**13**
AL-Imam almahdi	29283	5.26 %	**20**
AL-Imam alrhiza	24818	4.46 %	**17**
Arido	46198	8.30 %	**32**
AL-Shaheed waleed	48821	8.77 %	**34**
AL-Sadder	64788	11.64 %	**45**

AL-Bashaer	24128	4.33 %	**17**
Aum-albannin	17122	3.07 %	**12**
AL-bikhaee	17369	3.12 %	**12**
AL-muaalemin	15104	2.71 %	**10**
Total	410320	73.75 %	**284**

Table 2.2 : Distribution of the target population to 1st AL-Nasiriya sector

PHC center	Total population	%	Final sample
AL-Rasool	**34428**	**6.18 %**	**24**
AL-Iskan(main)	**21751**	**3.90 %**	**15**
AL-Iskan(typical)	**15729**	**2.82 %**	**11**
AL-15th shaaban	**20340**	**3.65 %**	**14**
AL-Kahrar	**15662**	**2.81 %**	**11**

AL-Imam al hassan	19742	3.54 %	14
AL-Manssoria	18418	3.31 %	13
Total	146070	26.25 %	102

2.1.5. The study tools

A. The questionnaire :

Special form of the questionnaire planned to collect information .The form of questionnaire consists of three sections .

Section1:includes questions about identity information (name, age,sex,number of family members ,occupation ,marital status, socioeconomic status, education level, race , religion).

Section2:includes some basic questions about the participant(place of birth, parents education),and some questions about hygiene and personal care (brush teeth, mouth wash,shower,water supply, sewage ,domestic animals)

Section3:includes clinical questionnaire(risk factors, health status, family history of H.pylori disease, clinical features of GIT disorders, drug history, health education)

B. Anthropometric measurements

1. Height: measured by calibrated scale
2. Weight: measured by portable instrument
3. Body mass index= weight (kg)/ height(m)2

C. Serological test

In this study we used serological test to detect H.pylori antibody in serum or plasma by specific kit (ABON). This test based on the detection of antibody of anti-H.pylori IgG antibody.

2.1.6. Pilot study

In order to test the feasibility of the research , time requirement and the cost a pilot study had been conducted from 1 April 2017 to 4 June 2017, on twenty participants prior to the proper study and the result discussed with the supervisor for any change or modification needed .All those twenty cases included in the proper study .

2.1.7. Definition of variables

1. Age: included all age groups that had been sub classified into:

<14 year

14-45 year

46-65 year

>65 year

2. Sex (male and female).

3. Marital status : classified as :

a. Married
b. single
c. widowed
d. divorced

4. Occupation : classified as :

a. Employed (governmental)
b. Self employed
c. Housewives
d. Retired

5. Educational level: classified as:

a. Illiterate
b. primary
c. secondary education
d. college and above .

6. Family size: the number of individuals live with participant .

7. Smoking habit: pack- year smoke (PYS)

8. Socioeconomic state : Socioeconomic status was classified into three levels (poor, intermediate, and high) according to the following scoring:

A:House: owned house scored as(1), rented or illegal house scored as (0).

B:Quarter: qualified quarter scored as (1), non-qualified quarter scored as (0).

C:Percapita monthly: 100.000 dinar and more scored as (1),< 100.000 dinar scored as (0).

An overall socio-economic status score was calculated for each subject as follow:

*a score of less than 1 indicate poor level.

*a score of 1-2 indicate intermediate level.

*a score of more than 2 indicate good level.

9. Residence : is the state of living in a particular place, which classified as

a. urban,
b. rural,
c. semi urban).

10. Per capita monthly : is basically the amount of money per person in a specific area, which calculate by : total income during month/ total person.

11. Serological test for H.pylori: to detects H.pylori antibody in serum or plasma.

12. Family member spend time away from home:(daily, monthly, and null).

13. Source of RO water: classified as outer and home RO source.

14. Sewage or water problem (yes or no).

15. Chronic diseases: classified as CVD, respiratory system, GIT,CNS, and endocrine diseases.

16. Body mass index(BMI): classified as underweight (< 18.5), normal (18.5-24.9), overweight (25-29.9), obese (30-34.9), severe obese (35-39.9), and very severe obese (> 40).

17. Frequency of brushing teeth: classified as no brushing, less than once /week, a few times/week, once/day, twice/day, and after every meal.

18. Frequency of mouth washing: classified as less than once/week, a few times/week, twice/day, after every meal.

19. Frequency bath or shower: classified as once/week, a few times/week, nearly every day, and constantly every day.

20. Clinical manifestation: included dysphagia, weight loss, anemia, recurrent vomiting, heartburn, postprandial fullness, early satiety feeling, belching, acid regurgitation.

2.1.8. Ethical considerations

The ethical considerations can be specified as one of the most important parts of research , it included the following principles :

1. Research participants should not be subjected to harm in any ways.

2. Respect for the dignity of research participants should be prioritized.
3. Full consent should be obtained from participants prior to the study.
4. The protection of the privacy of participants has to be ensured.
5. Adequate level of confidentiality of the research data should be ensured .
6. Anonymity of individuals and organizations participating in the research must be avoided.
7. Affiliations in any forms, sources of funding, and any possible conflicts of interests have to be declared.
8. Any deception or exaggeration about the aim and objectives of the research must be avoided.
9. Any type of communication in relation to the research should be done with honesty and transparency .
10. Any type of misleading information, and representation of primary data finding in a biased way must be avoided.

2.1.9. Formal Consent

This informed consent form is for men and women who attend to PHC, and who we are inviting to participate in the research of H.pylori extent and determinant . The title of our research project is" H.pylori : extent, determinants, and clinical predictors among PHC attendants in Thi-qar at 2017 ".

I am Dr- Mohammed.k.Yousif working for the college of medicine in university of Thi-qar. We are doing research on H.pylori infection, which is very common in our country . We are going to give you information and invite you to be part of this research,

and before you decide you can talk to anyone you feel comfortable with about the research. There may be some words that you do not understand, please ask me to stop as we go through the information and we will take time to explain. If you have questions later, you can ask them of me. Then we explain in simple terms the purpose of the research, and the language was used clarify rather than confuse, we used local and simplified terms for H.pylori infection.

The type of research intervention explained to the participants, by told them this research will involve a single injection in your arm. About the voluntary participation, we told them, the participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this PHC will continue and nothing will change.

Then we described to the participants what will happen on a step-by- step basis, during the research we takes some informations like identity, clinical questionnaire, personal hygiene and household hygiene. Then we takes a small amount of blood, equal to about a teaspoon, will be taken from your arm with a syringe. This blood will be tested for the presence of the infection , and this test will takes few minutes, this test have not any side effects or risks.

Then we explain how the researcher will maintain the data especially with respect to the information about the participant. We will not be sharing the identity of those participating in the research. The information that we collect from this research project will be kept confidential . Information about you that will be collected during the research will be put away and no-one ,but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researcher will know what your number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except the supervisor.

2.1.10. Statistical analysis

Statistical Package for Social Sciences (SPSS) version 24 had been used for data analysis . Descriptive statistics expressed in form of , frequencies, percentages, while inferential statistics for testing of associations by test of significance (Chi-square test, or Fisher exact test were used for analysis variable), means and standard deviations were used to present data of continuous variables. Correlation and logistic regression analysis were performed to recognize the independent predictors of H.pylori infection .A p-value < 0.05 was considered statistically .

Chapter three

Results

3.1. Socio-demographic characters of studied population

Three hundred and eighty six (386) primary health care attendants participated in this study. With the mean age of (31.73), that ranged from (4 to 75) years old ,the male represent (41.7%) and female was(58.3%).

Table 3.1 shows the socio-demographic characters of studied population . The majority of were within (15-45)years old were(67.87%), while the minority (1.81%) were more than (65) years old , with a significance difference between sex groups .

Regarding the respondents, the highest proportion of them was the participant him or herself (85.49%), while the participant mother and father showing lesser proportion were (12.69%, 1.81%) respectively.

The marital status show significant difference , more than two third (2/3) of them (71.76%) were married, and nearly one quarter (1/4) of them (25.9%) were single, while the

other (divorced and widowed) represented lesser proportion were (0.51%, 1.81%) respectively .

The educational level showing very high significant difference, nearly one third of them (34.45%) were at secondary level . the primary level represented-nearly- one quarter (26.94%) of them ,the illiteracy and university level were the lesser proportion of them

Variable	Male No. (%)	Female No. (%)	Total No. (%)	zX2 ,P Value

(17.35%, 7.25%) respectively.

Occupation show very high significant difference, most of them were employed(37.3%) predominantly males, and housewives (36.01%) represented majority of

Age				
<14 years	19 (38.8%)	30 (61.2%)	49 (12.69%)	**.039[b]**
15-45 years	100 (38.2%)	162 (61.8%)	262 (67.87%)	**.018**
46-65 years	38 (56.7%)	29 (43.3%)	67 (17.35%)	
>65 years	3 (42.9%)	4 (57.1%)	7 (1.81%)	
Respondent				
Participant	140 (42.4%)	190 (57.6%)	330 (85.49%)	**4.265[a]**
Participant mother	16 (32.7%)	33 (67.3%)	49(12.69%)	**.119**
participant father	5 (71.4%)	2 (28.6%)	7 (1.81%)	
Marital status:				
Married	113 (40.8%)	164 (59.2%)	277 (71.76%)	**7.959**
Single	48 (48.0%)	52 (52.0%)	100 (25.90%)	**.027[b]**
Divorced	0 (0.0%)	2 (100.0%)	2 (0.51%)	
Widowed	0 (0.0%)	7 (100.0%)	7 (1.81%)	
Education:				
Illiterate	17 (25.4%)	50 (74.6%)	67 (17.35%)	**34.073[a]**
Primary	31 (29.8%)	73 (70.2%)	104 (26.94%)	**.0001**
Intermediate	21 (40.4%)	31 (59.6%)	52 (13.47%)	
Secondary	81 (60.9%)	52 (39.1%)	133 (34.45%)	
University &above	10 (35.7%)	18 (64.3%)	28 (7.25%)	
Child (<6 year)	1 (50.0%)	1 (50.0%)	2 (0.51%)	
Occupation :				
Unemployed	13 (81.3%)	3 (18.8%)	16 (4.14%)	**175.537[a]**
Employed	106 73.6%)	38 (26.4%)	144(37.30%)	**.0001**
House wife	0 (0.0%)	139 (100.0%)	139 (36.01%)	
Student	26 (53.1%)	23 (46.9%)	49 (12.69%)	
Retired	2 (100.0%)	0 (0.0%)	2 (0.51%)	
Child (<6 year)	14 (38.9%)	22 (61.1%)	36 (9.32%)	
Residence :				
Urban	154 (41.6%)	216 (58.4%)	370 (95.85%)	**2.237**
Rural	5 (62.5%)	3 (37.5%)	8 (2.07%)	**.344[b]**
Semi urban	2 (25.0%)	6 (75.0%)	8 (2.07%)	
Total	161 (41.71%)	225 (58.29%)	386	

females. The other proportions of unemployed, student, and child were approximated (4.14%, 12.69%, 9.32%) respectively. The lesser proportion (0.51%) was retired. Residence showing no significant difference, most of studied population was urban(95.85%), while rural and semi urban were equal proportion (2.07%, 2.07%) respectively.

Table 3.1. Socio-demographic characters of studied population .

8Table 3.2. Distribution of H.pylori antibody test among risk factors

Risk factor	Positive H.pylori test No. (%)	Negative H.pylori test No. (%)	X^2 , P-value
Age :			
< 14 year	10 (20.4%)	39 (79.6%)	28.850
14-45 year	130 (49.6%)	132 (50.4%)	.0001[b]
46-65 year	44 (65.7%)	23 (34.3%)	
>65 year	6 (85.7%)	1 (14.3%)	
Sex :			
Male	97 (60.2%)	64 (39.8%)	12.808[a]
Female	94 (41.8%)	131 (58.2%)	.0001
Marital status :			
Married	154 (55.6%)	123 (44.4%)	22.557
Single	30 (30.0%)	70 (70.0%)	.0001[b]
Divorced	2 (100.0%)	0 (0.0%)	
Widowed	5 (71.4%)	2 (28.6%)	
Education :			
Illiterate	38 (56.7%)	29 (43.3%)	3.196[a]
Primary	47 (45.2%)	57 (54.8%)	.670
Intermediate	24 (46.2%)	28 (53.8%)	
Secondary	69 (51.9%)	64 (48.1%)	
University & above	12 (42.9%)	16 (57.1%)	
Child (<6 year)	1 (50.0%)	1 (50.0%)	
Occupation :			
Unemployed	10 (62.5%)	6 (37.5%)	35.138[a]
Employed	88 (61.1%)	56 (38.9%)	.0001
House wife	71 (51.1%)	68 (48.9%)	
Student	14 (28.6%)	35 (71.4%)	
Retired	2 (100.0%)	0 (0.0%)	
Child (<6 year)	6 (16.7%)	30 (83.3%)	
Residence :			
Urban	186 (50.3%)	184 (49.7%)	2.373
Rural	3 (37.5%)	5 (62.5%)	.369[b]
Semi urban	2 (25.0%)	6 (75.0%)	
Family size(crowding)			
> 7 overcrowding	71 (53.8%)	61 (46.2%)	1.488[a]
< or= 7 normal	120 (47.2%)	134 (52.8%)	.223

Family member away from the house :			
Daily	1 (20.0%)	4 (80.0%)	6.249[a]
Monthly	24 (66.7%)	12 (33.3%)	.044
Null	166 (48.1%)	179(51.9%)	
Source of RO water *			
Outer RO	172 (50.4%)	169 (49.6%)	1.125[a]
Home RO	18 (41.9%)	25 (58.1%)	.570
Sewage or water problem :			
Yes	41 (50.6%)	40 (49.4%)	.053[a]
No	150 (49.2%)	155 (50.8%)	.818
Smoking :			
Yes	38 (79.2%)	10 (20.8%)	19.324[a]
No	153 (45.3%)	185 (54.7%)	.0001
Chronic disease(CVD)			
Yes	28 (77.8%)	8 (22.2%)	12.717[a]
No	163 (46.6%)	187 (53.4%)	.0001
BMI :			
Underweight	13 (54.2%)	11 (45.8%)	5.925[a]
Normal	51 (40.8%)	74 (59.2%)	.314
Overweight	69 (53.9%)	59 (46.1%)	
Obese	45 (54.2%)	38 (45.8%)	
Severe obese	9 (47.4%)	10 (52.6%)	
Very severe obese	4 (57.1%)	3 (42.9%)	
Total	191 (49%)	195 (51%)	

*Two participants drink water from river and tank .

There was significant statistical association between age groups and H.pylori positive antibody, where the highest proportion among those who are more than 65 years old (85.7%), regarding the aged groups of 14-45 years old and 46-65 years old about half of them were H.pylori positive antibody (49.6%,65.7%) respectively. The lowest proportion was among those who are below 14 years old (20.4%).

Regarding the sex, also there was very high significant association with H.pylori positive antibody, where the p-value(0.0001),the highest proportion(60.2%) was among males, while females were lesser (41.8%).

The marital status showed very high significant association with H.pylori positive antibody, where the p-value (0.0001), the highest proportion(100%) was among the divorced, and nearly 2/3 (71.4%) of widowed were H.pylori positive antibody. A half of married (55.6%) was with H.pylori positive antibody, while the single were lesser (30%).

The occupation also showed very high significant association with H.pylori positive antibody. The highest proportion (100%) was within the retired , unemployed and employed were within the equal proportions (62.5%,61.1%) respectively. Nearly half of the housewives (51.1%) were with H.pylori positive antibody, the lesser proportion were among student and child (28.6%, 16.7%) respectively.

Smoking habit and cardiovascular disease also showing very high significant association with H.pylori positive antibody were(79.2%, 77.8%) respectively.

Family members who spend away from the house showing significant association with H.pylori antibody test, where the p-value (0.044),the highest proportion(66.7%) was among those who are spend monthly.

While the other risk factors(education, residence, family size, source of RO water, sewage problem, and BMI) had been asked about, even though there was a difference in their proportion show no significant statistical association.

Table 3.3. : Distribution of H.pylori infection according to the behavioral characters

A- personal hygiene

Behavioral character	Positive H.pylori test No. (%)	Negative H.pylori test No. (%)	X2, P value
Frequency of brushing teeth:			
No	76 (52.1%)	70 (47.9%)	1.622[a]
Less than once/ week	7 (50.0%)	7 (50.0%)	.899
A few times / week	28 (45.9%)	33 (54.1%)	
Once /day	73 (49.7%)	74 (50.3%)	
Twice /day	6 (37.5%)	10 (62.5%)	
After every meal	1 (50.0%)	1 (50.0%)	
Frequency of mouth washing:			
less than once/ week			
A few times /week	0 (0.0%)	1 (100.0%)	3.498
Twice /day	0 (0.0%)	1 (100.0%)	.308[b]
After every meal	2 (100.0%)	0 (0.0%)	
	189 (49.5%)	193 (50.5%)	
Frequency of bath or shower:			
once / week	8 (88.9%)	1 (11.1%)	8.222
A few times /week	0 (0.0%)	2 (100.0%)	.011[b]
Nearly every day	182 (48.7%)	192 (51.3%)	
Constantly every day	1 (100.0%)	0 (0.0%)	
Smoking habit :			
Yes	38 (79.2%)	10 (20.8%)	19.324[a]
No	153 (45.3%)	185 (54.7%)	.0001
Total	191 (49%)	195 (51%)	**386 (100%)**

Even though there was no significant statistical association ,The highest proportion of H.pylori positive was among those who did not brush their teeth (52%), the other proportions among those who are brush their teeth where of comparable results ; near 50% except those who are twice daily (37.5%).

Even though there was no significant statistical association , the highest proportion of H.pylori antibody positive was among those who are washing their mouth twice daily, while those who are washing their mouth after every meal showing lesser proportion, there was no

one of those with less than once per week and a few times per week showing H.pylori positive antibody.

Highest proportion of H.pylori antibody test of take bath was once per week (88.9%), and there was significant statistical association.

B-home hygiene

Behavioral character	Positive H.pylori test No. (%)	Negative H.pylori test No. (%)	X2, P value
Source of drinking water:			
Water tank	1 (100.0%)	0 (0.0%)	1.870
River water	0 (0.0%)	1 (100.0%)	.745[b]
Other (R.O)	190 (49.5%)	194 (50.5%)	
Domestic animal in house:			
Yes	43 (48.9%)	45 (51.1%)	.017[a]
No	148 (49.7%)	150 (50.3%)	.895
Mice getting in house :			
Yes	72 (51.8%)	67 (48.2%)	.466[a]
No	119 (48.2%)	128 (51.8%)	.495
Sewage or water problem :			
Yes	41 (50.6%)	40 (49.4%)	**.053[a]**
No	150 (49.2%)	155 (50.8%)	**.818**

Even though there was no significant statistical association , the highest proportion of H.pylori antibody positive was among those who are drinking water from tank (100%), while there was a comparable results among those who are drinking RO type of water .

Even though there was no significant statistical association , there was a comparable results between those who are having domestic animal and do not have and also a

comparable result between those of mice getting in house and without and also between those who are with sewage or water problem and those without.

Table 3.4. : Distribution of H.pylori infection according to clinical manifestation

Clinical manifestation	Positive H.pylori test NO. (%)	Negative H.pylori test No. (%)	X2 , P value

Difficulty swallowing (solid) ?			
Yes	11 (84.6%)	2 (15.4%)	6.643[a]
No	180 (48.3%)	193 (51.7%)	.010
Unexplained weight loss :			
Yes	10 (41.7%)	14 (58.3%)	.625[a]
No	181 (50.0%)	181 (50.0%)	.429
Unexplained anaemia :			
Yes	25 (48.1%)	27 (51.9%)	.047[a]
No	166 (49.7%)	168 (50.3%)	.828
Recurrent vomiting :			
Yes	19 (54.3%)	16 (45.7%)	.355[a]
No	172 (49.0%)	179 (51.0%)	.551
Recurrent heartburn:			
Yes	113 (60.8%)	73 (39.2%)	18.243[a]
No	78 (39.0%)	122 (61.0%)	.0001
Postprandial fullness :			
Yes	127 (62.6%)	76 (37.4%)	29.305[a]
No	64 (35.0%)	119 (65.0%)	.0001
Early satiety feeling :			
Yes	46 (46.9%)	52 (53.1%)	.340[a]
No	145 (50.3%)	143 (49.7%)	.560
Recurrent acid regurgitation			
Yes	51 (66.2%)	26 (33.8%)	10.798[a]
No	140 (45.3%)	169 (54.7%)	.001
Belching :			
Yes	71 (66.4%)	36 (33.6%)	16.861[a]
No	120 (43.0%)	159 (57.0%)	.0001

There was significant statistical association between difficulty in swallowing to the solid food and HP+ve AB, where the highest proportion was among those who are taking a

solid food (84.6%) , and also such association had been shown between recurrent heartburn with antibody, where largest proportion among those with recurrent heartburn(54.3%).

Postprandial fullness show significant statistical association with HP+ve AB , where the highest proportion were (62.6%).

Recurrent acid regurgitation show very high significant statistical association where the highest proportion was (66.2%).

Belching showing also a very high significant statistical association , where the highest proportion was (66.4%).

While the other clinical manifestation had been asked about, even though there was a difference in their proportion, show no significant statistical association.

Table 3.5. :Distribution of H.pylori infection according to SES

SES	**Positive H.pylori test No. (%)**	**Negative H.pylori test No. (%)**	**X2 , P value**
Poor	12 (41.4%)	17 (58.6%)	**1.048[a] .592**
Intermediate	105(51.2%)	100 (48.8%)	
Good	74 (48.7%)	78(51.3%)	

Even though there is no significant statistical association different category ,the highest proportion of intermediate socioeconomic status with H.pylori positive antibody. The majority of studied population located at intermediate and good level of socioeconomic status, and the minority located at poor level.

Table 3.6. : Distribution of H.pylori infection according to total CM

Total CM	**Positive H.pylori test No. (%)**	**Negative H.pylori test No. (%)**	**X2, P value**
Asymptomatic	28 (29.8%)	66 (70.2%)	**28.511[a] .0001**
Having one symptom	25 (39.1%)	39 (60.9%)	
Having2-4 symptoms	122 (60.7%)	79 (39.3%)	
Having> 5 symptoms	16 (59.3%)	11 (40.7%)	

Total clinical manifestations showed very high significant statistical association, where the p-value (0.0001), where the highest proportion was among groups which having

two-four accumulative symptoms (60.7%), and those who have more than five symptoms (59.3%). While those who are asymptomatic nearly quarter of them showing significant association with HP+veAb was (29.8%), and those who are having one symptom nearly third of them showing significant association was (39.1%).

Table 3.7. : Distribution of H.pylori infection according to co morbidities

Co morbidities	Positive H.pylori test No. (%)	Negative H.pylori test No. (%)	X2, P value
CVS :			
Yes	**28 (77.8%)**	**8 (22.2%)**	**12.717[a]**
No	**163 (46.6%)**	**187 (53.4%)**	**.0001**
Resp. system :			
Yes	**4 (36.4%)**	**7 (63.6%)**	**.779[a]**
No	**187 (49.9%)**	**188 (50.1%)**	**.377**
GIT :			
Yes	**2 (100.0%)**	**0 (0.0%)**	**.244 ***
No	**189 (49.2%)**	**195 (50.8%)**	**.244**
Endocrine system:			
Yes	**18 (54.5%)**	**15 (45.5%)**	**.370[a]**
No	**173 (49.0%)**	**180 (51.0%)**	**.543**
CNS :			
Yes	**0 (0.0%)**	**1 (100.0%)**	**1.000 ***
No	**191 (49.6%)**	**194 (50.4%)**	**.505**

Cardio vascular system disease showing very high significant statistical association where the p-value (0.0001) and (77.8%) of those with having CVS were with AHP+Ab .

Respiratory disease, endocrine, GIT, and CNS showing no significant statistical association even there was a big difference in their repsentativness of H.pylori antibody.

Table 3.8. Distribution of H.pylori antibody among PYS

PYS	Positive H.pylori test No. (%)	Negative H.pylori test No. (%)	X2 , P value
Light smoking <or = 5	4 (66.7%)	2 (33.3%)	**1.266** **.665[b]**
Moderate smoking 5-10	9 (75.0%)	3 (25.0%)	
Heavy smoking >10	24 (82.8%)	5 (17.2%)	

Even though there is no significant statistical association. Between different category the highest proportion of smoker with H.py. positive antibody.

Table 3.9. : distribution of H.pylori infection according to specific features may be related

Specific features	Positive H.pylori test No. (%)	Negative H.pylori test No. (%)	X2 , P value
Do you take aspirin			
Yes	6 (60.0%)	4 (40.0%)	.454[a]
No	185 (49.2%)	191 (50.8%)	.500
Do you take anti-inflammatory drugs			
Yes	2 (50.0%)	2 (50.0%)	1.000 *
No	189 (49.5%)	193 (50.5%)	.377
Stomach or heartburn medications:			
Yes	13 (52.0%)	12 (48.0%)	.068[a]
No	178 (49.3%)	183 (50.7%)	.795
Any allergy to medication			
Yes	7 (43.8%)	9 (56.3%)	.219[a]
No	184 (49.7%)	186 (50.3%)	.640

Even though there is no significant association between these specific features and H.pylori infection ,nearly half of those who are taking aspirin, anti-inflammatory drugs, heartburn medication, and drugs allergy(penicillin) with H.pylori positive antibody, were(60%,50%,52%,43.8%) respectively.

Table 3.10 Distribution of accumulative risk factors to H.pylori antibody among studied population

No. of risk factors	Positive H.pylori test No. (%)	Negative H.pylori test No . (%)	X^2, p-value
1(1-4 symptoms)	32 (42.7%)	43 (57.3%)	2.050[a] .359
2(5-9 symptoms)	150 (51.5%)	**141 (48.5%)**	
3(10-15 symptoms)	9 (45.0%)	**11 (55.0%)**	

Even though there is no significant association between these accumulative risk factors ,nearly alf of those who are having 1-4 symptoms,5-9 symptoms, and 10-15 symptoms with H.pylori positive antibody were (42.7%, 51.5%, 45%) respectively.

Table 3.11. : Study the association of risk factors with the occurrence of H.pylori infection by logistic regression analysis

Significance	Variable	B	p- value	Exponential (B)		
					Lower	upper
significance	Sex (1)	-1.070	0.002	0.343	0.174	**0.675**
	Occupation		0.022			
	occupation (1)	-0.964	0.220	0.381	0.082	**1.779**
	occupation (2)	-1.208	0.023	0.299	0.105	**0.848**
	occupation (3)	-1.844	0.001	0.158	0.053	**0.475**
	occupation (4)	-0.780	0.191	0.458	0.142	**1.475**
	occupation (5)	-20.804	0.999	0.000	0.000	
	Taken bath or shower		0.239 *			
	CVD (1)	-1.000	0.026	0.368	0.153	**0.887**
	Smoking (1)	-0.914	0.036	0.401	0.171	**0.943**
	Total CM		0.009			
	TotalCM (1)	0.572	0.309	1.772	0.588	**5.345**
	Total CM (2)	0.118	0.836	1.125	0.368	**3.441**
	Total CM (3)	-0.445	0.386	0.641	0.234	**1.753**
Non significance	Age	-0.162	0.528	0.850	0.513	**1.409**
	Marital status	0.369	0.690	1.447	0.235	**8.899**
	Difficulty swallowing for solid food (1)	-1.538	0.082	0.215	0.038	**1.213**

Logistic regression has been done in form of multivariate analysis to show the effect and association of independent variables on positivity of H.pylori antibody resulting in :sex, occupation,CVD, smoking habit, difficulty swallowing to solid food and total clinical manifestation having a significant association , where the P-value less than 0.05 and exponential B was 0.343, 0.381, 0.368, 0.401, 0.215, 1.772 respectively, while the age and

marital status show no significant statistical association *The Odds ratio for the taken bath or shower was very high (80692482.232) because there was no one occupying the nill group

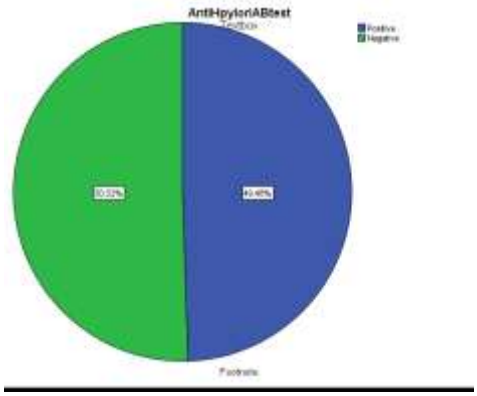


Figure 3.1. Prevalence of H.pylori antibody among studied population There is no obvious difference between expression of H.pylori antibody in studied population .

Most of our study population of Rh positive, blood group O^+(54.66%) repsenting the largest proportion group followed by group A^+ with (19.43%),then AB^+ group with (11.66%),the lesser proportional group is B^+ with (8.55%).

While all negative Rh groups showing nearly similar proportions, that ranged between (2.33%) and (1.04%).

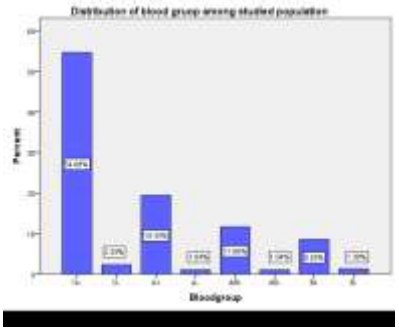


Figure 3.2 Distribution of blood group among studied population

The highest accumulated number of risk were of those having five risks (26.17%) and those who are having four, six, and seven have nearly equal proportion (17.88%, 18.91%, 16,84%) respectively. The lowest proportion was those who having twelve risks (0.52%), and those who having three and eleven risks were(1.55%, 1.04) respectively.

While those who having eight, nine, and ten risks nearly equal proportion (7.51%, 5.96%, 3.63%) respectively .

No one having one or two risks.

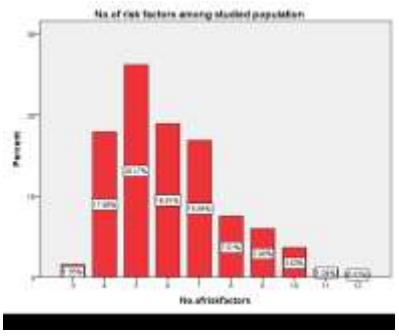


Figure 3.3. Number of risk factors among studied population

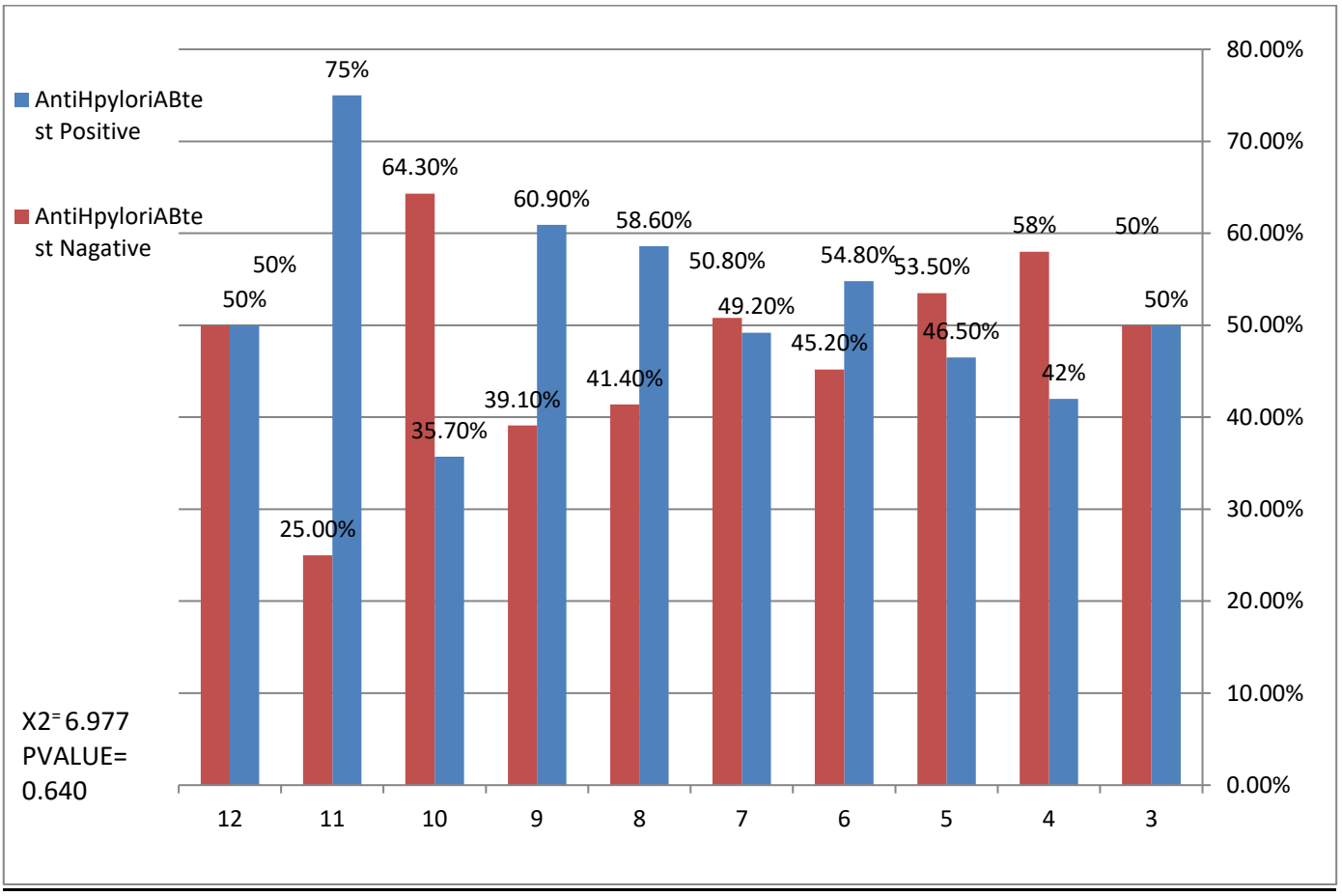


Figure 3.4. Distribution of H.pylori infection according to the number of risk factors among studied population

Chapter four

Discussion

A cross-sectional study extended over one year to include (386) primary health care attendants in AL-Nasiriya city to estimate the prevalence of H.pylori infection, which was estimated at (49.48%).

4.1. Refusal rate

Of the sample size 7% refused the cooperation with researcher mainly after asking them to get 2cc of blood to analyze for H.pylori , but no one refusing the cooperation regarding the filling of questionnaire forma. So all formas of them had been neglected , most of those who are considered as refutes are children about 70%. Of the total refused rate.

4.2. Prevalence

H.pylori infection affects more than half of the world`s population, and it is more prevalent in poor socio-economic environment . H.pylori described in current medical literature as a group 1 carcinogen, also H.pylori infection having long term sequelae such as peptic ulcer and carcinoma, for all these reasons we done this research paper.

The study result(prevalence) was lower than USA (Alaska Native People) study which was(63% at 1998-2005) [177] , and to other studies, in EMRO (Eastern Mediterranean Region) were Golestan province (Northeast Iran) 66.4% (2010) [178], Libya 76% (2002) [179], Tunisia 64% (2010) [180], UAE 74.1% (2006) [181], Oman 69.5% (2013) [182],and Shinshai-China 71.7% (2010) [183] .

Lower than this estimate was reported from other studies were KSA 28.3% (2012) [184], Northeastern Penin sular Malaysia 19% (2010) [185], Australian adult 15.5% (2011) [186].

This differences could be attributed to the different methodology, prevalence of common risk factors, criteria of the sample, as well as the specificities of techniques employed in studies.This study employed H.pylori antibody test because its availability and cost.

4.3. Determinants

The study shows very high significant statistical association of age with H.pylori positive antibody, the highest proportion was (85.7%) at the age more than 65 years old, then the prevalence shows decrease gradually with deceasing the age groups(46-65 year, 14-45 year, and less than 14 years) were (65.7%, 49.6%, 20.4%) respectively. This result is similar to the results in our region(EMRO) and most of developing countries, which regarded the increasing in the age as a risk factor for H.pylori infection [187], these reflected to that the H.pylori infection in developing countries occur earlier in life and with high frequency.

Our study showed very high significant association of sex with H.pylori positive antibody, the males were with higher H.pylori prevalence (60.2%) than females (41.8%) and the sample was predominantly females. The gender effect on prevalence of H.pylori infection in many populations are varied , more recent and more comprehensive meta-analysis concluded a higher prevalence of H.pylori in men than in women but not in children[188].

Marital status also showed very high significant statistical significant association. The divorced was with highest proportion (100%) and the lesser proportion was with single(30%), while other(married and widowed) were (55.6%, 71.4%) respectively, also our study showed higher prevalence among married than the single. These results agree with a

Libyan study which reported that the marital status and H.pylori infection [189], and spouse-to spouse has a major role for H.pylori infection[190].

The occupation showed very high significant association with prevalence of H.pylori infection ,the unemployed, slightly had higher prevalence of H.pylori infection than those employed, this due to that work factors were not investigated in our study. this result agree with study done in Mexico(2013)[191].

This study showed very high significant association between smoking habit and prevalence of H.pylori infection ,and nearly more than 3/4 of individual who were cigarette smoking had H.pylori positive antibody and this agree with a study in China (2009)[192], other epidemiological studies have indicated that the smoking is a risk factor for H.pylori infection at least under certain clinical condition [193].

Cardiovascular disease showed very high significant statistical association with H.pylori seropositive antibody, some studies also shows ass0ciation between cardiovascular disease and H.pylori infection , example in Korea (2007)[194] and Turkey (2009)[195]. Development of cardiovascular disease is due to damaging effect of bacteria or its products 0n the coronary endothelium.

Spend a time away from the house showed association with H.pylori positive antibody p-value (0.044), that due to the H.plori infection considered as contagious disease can be transmitted by saliva, feco-oral route and poor hygiene .

This study shows no significant statistical association between education level and H.pylori seropositive antibody ,this result did not agree with some studies in European city (2013) [196] ,US(2009)[197], Iran (2009)[198], Brazil [199] (2002) ,this may be due to sample and socioeconomic differences. Our result has agreement with study in northeastern Brazil(2001)[200] .

We found no association between H.pylori infection and residence, this result is agreement with study in Iraq among university students[201]. Other studies showing

significant association with residence, were in Turkey (2007)[202]and southern Ethiopia (2013)[203], and this reflected to ,most of participants in our study was from urban area.

We could not find a significant association between family size and H.pylori seroprevalence, which is in agreement with study in West of Iran (2008)[204],Taiwan (2009) [205]. Other studies show highest prevalence with overcrowded home ,Egypt (2008)[206], southern Nigeria (2012)[207].

The distribution of H.pylori infection was repeated to be affected by the sources of water, but in our study did not show any significant association between source of water and H.pylori seropositive antibody. Most of epidemiological studies in many countries such as Lima Peru [208] and Colombia [209] had shown association of prevalence of infection with water sources. This difference may be due to limited sample size in our study. We found a study has same our result which was in Makurdi North central Nigeria[210].

Our study indicate that BMI was not associated with H.pylori positive antibody, this result is in agreement with some studies in US (2005) [211,212]. Several studies showed high significant association between prevalence and BMI [213,214,215]. The association between H.pylori infection and BMI remain unclear .

This study shows no significant statistical association between sewage problem and prevalence of H.pylori infection ,but there are several studies showed minimal differences with access sewage system such as (Olmos et al.2000; Redlinger et al .1999; Souto et al. 1998). This may be reflect to the well-designed septic tanks.

Our study shows no significant association between socio-economic status and prevalence of H.pylori infection which agrees with study in India[216]. Other studies shows a higher prevalence of H.pylori infection with low socio-economic status [217,218,219], this may reflected to sample size.

4.4.clinical manifestations

The study shows significant statistical association of H.pylori positive antibody with difficulty of swallowing of solid food ,p-value (0.010) ,this result did not agree with study in Iran 2008[220].

Dyspeptic symptoms such as belching and post prandial fullness shows very high significant statistical association with H.pylori positive antibody and these results are agree with many study in Iran 2008[220], Strauss et al [221] and Rokkas et al [222].

Recurrent heartburn and recurrent acid regurgitation shows significant association with H.pylori positive antibody, this result did not agree with study in Japan 2004[223]. This may be reflect to different environmental or health status to the studied population.

The study shows no significant association between early satiety and H.pylori infection ,this agrees with study in China 2008[224]. Regarding vomiting , the current study showing no association with H.pylori positive antibody , this result did not agree with Chinese study in 2008 [224] and this may reflect to, sample size ,or genetic predisposition .

The study shows no significant statistical association between anemia and H.pylori antibody this results agrees with study in Estonia 2011[225] and inverse to the study in China 2010[226], and Germany 2001[227]. This difference may reflect to inclusion criteria ,socio-economic status and nutritional status.

We could not found a significant statistical association between unexplained weight loss and H.pylori positive antibody , these results agree with study in US 2005[188,189]. Other studies showing significant association between prevalence of H.pylori and weigh loss such in Turkey 2009[190],Denmark 2000 [191], and Iceland 2009 [192] .

4.5.Diagnosis

In this study we used serological test to detect H.pylori antibody in serum or plasma by specific kit (ABON). This test based on the detection of anti-H.pylori IgG antibody , it is most common , accurate, inexpensive, rapid and acceptable to individuals. A study in Japan at 2014 showed that the sensitivity and specificity for serological test were (91.2%) and (97.4%) respectively[228]. This test detects both acute and chronic infection.

Diagnostic tests, usually divided into invasive and non-invasive methods. The invasive include endoscopy, histology, rapid urease test, and culture, while non-invasive test include urea breath test, stool antigen and serological tests.

4.6.Treatment

Chosen of regime for eradication of H.pylori infection depend on bacterial resistance and drug availability as a following regimes :

1.Triple therapy :it is act as first line of treatment, which includes:

* Proton pump inhibitor(PPI): omeprazole 20 mg BID, lansprazole 30 mg BID,esomeprazole 40 mg QD, or rabeprazole 20 mg BID, or pantrazole 40 mg QD[229] PLUS Clarithromycin 500 mg BID or metronidazole 500 mg BID(when there is clarithromycin resistance)[230]. PLUS amoxicillin 1000 mg BID or metronidazole , the duration of this regime for 14 days [231].

* Bismuth-based therapy : it is alternative first line therapy : PPI or H2 receptor antagonist (lansprazole 30 mg BID or ranitidine 150 mg BID [208]. PLUS Bismuth subsalicylate 525

mg QID or Bismuth tripotassium dicitrate 300 mg QID [230]. PLUS metronidazole 500 mg TID PLUS Tetracycline 500 mg QID, the duration is 10-14 days.

* Levofloxacin- containing therapy : it is alternative to first line therapy [232]: PPI + amoxicillin 1 g BID + levofloxacin 500 mg QID for 10 days.

* Sequential therapy it is also alternative to first line therapy[233]. :which include : PPI +amoxicillin 1g BID fpr 5-7 days, Then PPI +levofloxacin 500 mg BID +another antibiotic (Tinidazole 500 mg BID) for 5-7 days.

2.Second line therapy : avoid repeating first line therapy and should incorporate at least one different antibiotic.

3.Third line therapy :send biopsy specimen for antimicrobial culture before treatment . PPI+ Bismuth potassium citrate 220 mg BID +tetracycline 500 mg QID or amoxicillin 1g TID + Furazolidone 100 mg TID or tetracycline 500 mg QID or metronidazole 400 mg QID. For 14 days.

4.7. Limitations

The study conducted in AL-Nasiryia city which was urban area, so most of sample was from urban(95.9%), while rural represented 2.1% which does not give idea about the prevalence in population at rural area.

In diagnosis we used serological test(anti H.pylori antibody),this test conducted both acute and chronic cases, but stool antigen test and urea breath test indicated the acute cases and useful for follow up. Most of studies in developing countries showed that the prevalence increased in the 1st ten years of life, in this study age below 14 years represented 12.69%. our study was designed to assess the prevalence in general population (asymptomatic), not in specialized hospitals.

Chapter five

Conclusions and recommendations

5.1. Conclusions

1. This study reveals that nearly half of studied population in our society suffer from H.pylori infection and its complication , virtually that might have a significant impact on individuals themselves, their family and economic burden.

2. The highest prevalence of H.pylori antibody was among age >65 years old, of male gender, divorced, of illiterate level of education, of retired occupation , of urban residence, of family size more than 7, of outer RO water supplement, , having CVD and very severe obese.

3. Most prevalent behavioral factor among HP+veAb were not brushing their teeth , mouth washing after each meal , taking bath or shower every day , drinking water from tank, and smoker.

4. The risk factors which had significant statistical association By univariate analysis were age, sex, marital status, occupation, family member away from the house cardiovascular disease , smoking habit taking bath or shower, and the total clinical manifestations, this may reflect the high prevalence of risk factors.

5. Females tend to have lower infection rates than the males ,this may be as a reflection of difference in exposure levels to risk factors.

6. The most prevalent clinical manifestations which had significant statistical association are difficulty in swallowing , recurrent heartburn, postprandial fullness, recurrent acid regurgitation and belching.

7. H.pylori infection did not depend on the number of clinical manifestation , but the type of clinical feature is important.

8. Multivariate analysis show significant statistical and epidemiological association were with sex, occupation , cardiovascular disease and smoking habit.

9. Majority of the patients with difficulty in swallowing predicted HP+ve Ab , while 2/3 of recurrent acid regurgitation, belching , post prandial and recurrent heartburn predicting positivity of these antibody .

10. Most of our study population have at least five risk factors.

11. Accumulation of risk factors entities did not show significant Statistical Association with seroprevalence of H.pylori infection

5.2. Recommendations :

1. Further studies are required to identify the environmental risk factors, treatment, and preventive measures.
2. Because of H.pylori infection in most conditions is asymptomatic and its fatal complication such as gastric cancer, the population need to regular screening for infection or its risk factors.
3. Promote health education about mode of transmission of this contagious disease.
4. Investigation of H.pylori infection plays important role in managements of occurrence of peptic ulcer would be further explored.

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