Prevalence of Helicobacter Pylori Infection In Pregnant Women With Iron Deficiency Anemia And Intra Uterine Growth Retardation

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Abstract

Background: Helicobacter pylori (H. pylori) infection affects approximately one half of the world population and it is more prevalent in developing countries. The prevalence of H. pylori infection in pregnant women varies according to geographic area, socioeconomic conditions and method used to detect H. pylori infection.

Aim: to assess Prevalence of Helicobacter Pylori Infection in pregnant women with iron deficiency anemia and intra uterin growth retardation.

Methods: This cross sectional study was carried out from February 2021 to August 2022 at obstetrics & gynecology and microbiology departments, faculty of medicine, Zagazig University, This included 256 pregnant women attending antenatal clinic during the period of the study, The presence of H. pylori antigen in the faeces provides unmistakable proof of bacterial colonization in the GIT.

Results: among the studied cases there were 68 (28.5%) who had helicobacter pylori, there was statistically significant relation between helicobacter pylori and iron deficiency anemia, as well as Intrauterine growth restriction (IUGR).

Conclusion: H. pylori infection was investigated not only in association with gastrointestinal manifestations during pregnancy but also with other severe pregnancy-related disorders. There was statistically significant relation between helicobacter pylori and iron deficiency anemia & IUGR.

Keywords: Helicobacter Pylori, Obstetric

Introduction

Helicobacter pylori (H. pylori) infection affects approximately one half of the world population and it is more prevalent in developing countries. This microorganism colonizes the stomach. Typically, it is acquired during childhood and causes asymptomatic chronic infection. A small portion of H. pylori infected subjects develop peptic ulcers and gastric carcinoma, usually during late adulthood **(1).**

The prevalence of H. pylori infection in pregnant women varies according to geographic area, socioeconomic conditions and method used to detect H. pylori infection. For example, the prevalence of H. pylori infection among pregnant women is about 20%-30% in most European countries, Japan and Australia, while it is 50%-70% in Turkey, Mexico and in Texas, United States, more than 80% in Egypt and Gambia. Furthermore, inadequate sanitation practices, low social class and crowded or high-density living conditions seem to be related to a higher prevalence of H. pylori infection. These observations suggest that poor hygiene and crowded conditions may facilitate transmission of infection among family members and they are consistent with data on intra-familial and institutional

clustering of H. pylori **(2).**

During the past decades, several reports indicated a correlation between H. pylori infection and various extragastric disorders. Such manifestations include ischemic heart disease, diabetes mellitus, idiopathic thrombocytopenia, urticaria, and sideropenic anemia. **Lanciers et al (3)** found a significantly increased incidence of pregnant subjects with high H. pylori IgM (marker for recently acquired infection) compared to non-pregnant women. **(4).**

Muhsen et al (5) recommended the investigation of H. pylori infection as a potential factor that might play a role in the occurrence of anemia in children and pregnant women. Furthermore, eradication of H. pylori infection has been recommended for patients with unexplained iron deficiency anemia (IDA). These recommendations are based on several studies that found a relationship between H. pylori and IDA .

Eslick et al (6) observed for the first time an association between H. pylori infection and low birth weight, in particular they showed that intrauterine growth restriction was more common in H. pylori seropositive women (13.5%) than in seronegative mothers (6.0%) (OR = 2.41; 95%CI: 1.14-5.08; P = 0.018). Furthermore, it has been reported that H. pylori infected mice showed a decrease in implantation rates, and their offspring were of low birth-weight. However, in another experimental mice model study these results were not confirmed **(7).**

The aim of this study was to assess Prevalence of Helicobacter Pylori Infection with Different Obstetric Conditions.

Subjects and Methods:

This study was carried out from February 2021 to August 2022 at obstetrics & gynecology and microbiology departments, faculty of medicine, Zagazig University after review and approval by the institutional review board (Zu-IRB) committee at faculty of medicine (IRB reference number (6558). This study is cross-sectional study included 256 pregnant women attending antenatal clinic during the period of the study.

Inclusion criteria:

- Hyperemesis gravidarum
- Iron deficiency anemia
- IUGR.
- Pregnant women with history of gastrointestinal illness.

Exclusion criteria:

- History of peptic ulcer or H. pylori eradication before pregnancy.
- History of chronic drugs intake"e.g., nonsteroidal anti-inflammatory drugs (NSAIDs)".
- Thyroid disorders, psychiatric problems, liver or renal disorders, urinary tract infections, diabetes mellitus.
- Not taking antibiotics or metronidazole.

Methods:

All patients were subjected to the following*:*

A. Complete history was taken with special emphasis on:

- Personal history: age, marital status, parity, address, occupation and any special habits.
- Complaint of each woman in the study: period of infertility, type of infertility whether primary or secondary, hirsutism and acne.
- Menstrual history: with emphasis on menstrual dating and regularity.

- Obstetric history: parity, previous pregnancy outcome, mode of delivery, any postpartum complication, number of abortions, induced or spontaneous, followed by surgical evacuation or not and if there were any post abortive complications.
- **Contraceptive history :(Type& duration)**

- **Past history of any medical problem:** as {hypertension, diabetes mellitus and deep venous thrombosis (DVT)}, history of blood intake, allergy to certain drugs and any previous operations including cesarean section (CS).

B. Clinical examination:

- Vital signs: Blood pressure, pulse and temperature.
- Weight, height, BMI
- Abdominal examination for assessment of fundal level and fetal heart sounds.

Assessment of fetal well-being:

- Abdominal ultrasound for assessment of confirm viability, check for gestational age, biometry of the fetus, site of the placenta and amniotic fluid index and assessment of estimated fetal weight.
- **CTG - FHR pattern and evidence of uterine activity.**

Lab assessment:

a. Complete blood count .

b. Liver functions (SGOT, SGPT, Serum albumin, Total bilirubin)

d. Blood glucose level e. Serum creatinine

Helicobacter pylori stool antigen test.

Detection of H.pylori antigen in the stool is a definite indicator of bacterial colonization in the gastrointestinal tract ,ELISA is the technique of choice for this antigen. The amount of H.pylori antigen present in the stool was measured by specific ELISA method by using ELISA test kits based on the principle of sandwich enzyme-linked immune sorbent assay . in this method ,the extracted samples react with solid phase monoclonal antibodies against anti-H pylori stool antigen coated on microtiter well.

Calculation results; by using ELISA OD capability results greater than 1.1 are considered as positive and those lower than 0.9 are considered negative.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level.

The used tests were:

1 - Chi-square test

For categorical variables, to compare between different groups

2 - Student t-test

For normally distributed quantitative variables, to compare between two studied groups

Results:

Table (1): Descriptive of studied cases according to demographic data

Demographic data	Cases (n=256)	
Marital status	No.	%
Married	256	100.0
Occupation		
Not working	176	68.8
Working	80	31.2
Residence		
Rural	157	61.3
Urban	99	38.7

This table shows that all the studied cases were married, among the studied group there were 176 (68.8%) not working and 80 (31.2%) working and there were 157 (61.3%) rural residents and 99 (38.7%) urban residents.

Among the studied cases there were 188 (73.4%) with no comorbidities, 33 (12.9%) who had hypertension and 35 (13.7%) who had DM, 121 (47.3%) with history of gastrointestinal illness, 56 (21.9%) with anemia, 9 (3.5%) with Allergy to medication and 63 (24.6%) with IUGR.

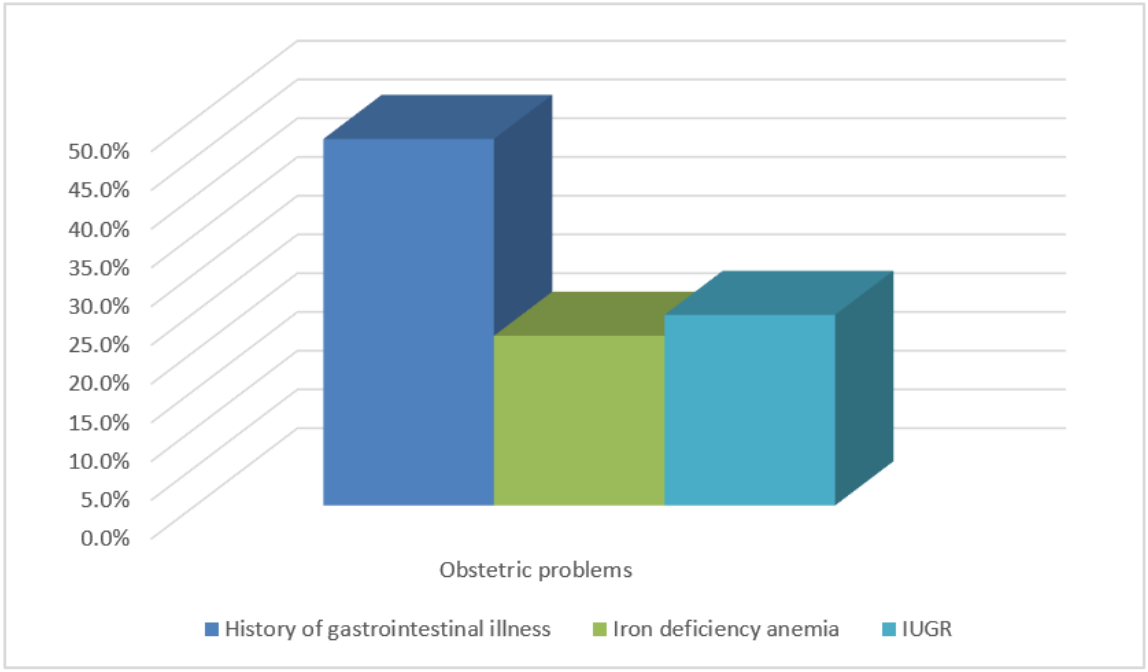

Figure 1: Descriptive of studied cases according to obstetric problems

Among the studied cases there were 78 (30.5%) who had helicobacter pylori. (figure 2)

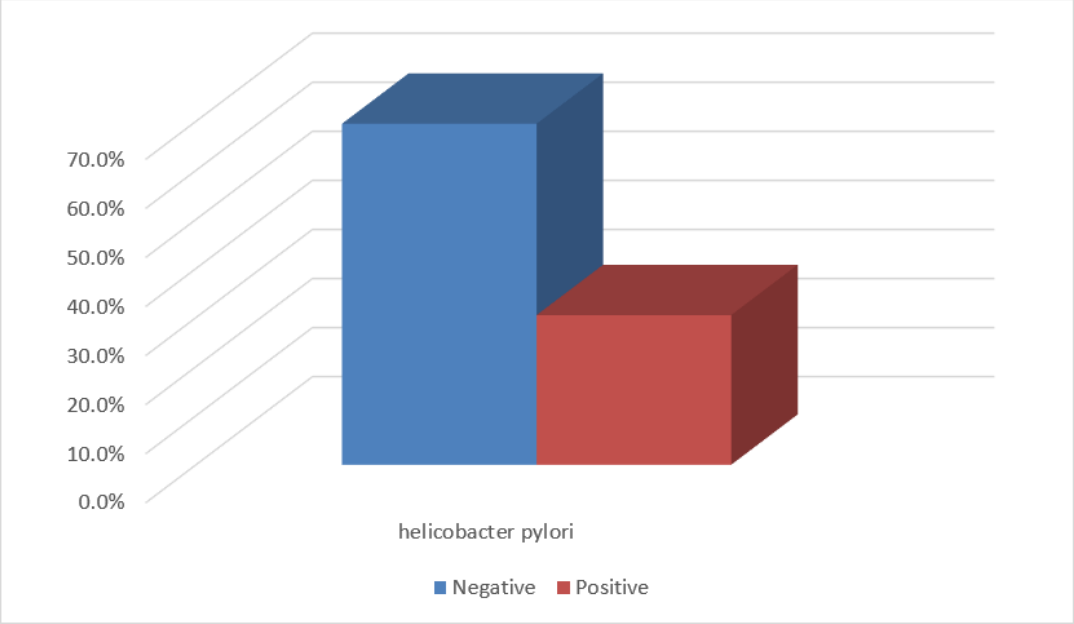

Figure 2: Descriptive of studied cases according to helicobacter pylori

Table (2): Prevalence of helicobacter pylori among cases with history of gastrointestinal illness

History of gastrointestinal illness	Helicobacter pylori				Test	p
	-ve		+ve			
No	100	56.2	35	44.9	χ^2= 2.782	0.095
Yes	78	43.8	43	55.1		

This table shows that there was no statistically significant relation between helicobacter pylori and history of gastrointestinal illness

Table (3): Prevalence of helicobacter pylori among cases with iron deficiency anemia

Iron deficiency anemia	Helicobacter pylori				Test	p
	-ve		+ve			
No	158	88.8	42	53.8	χ^2= 38.693	<0.001*
Yes	20	11.2	36	46.2		

This table shows that there was statistically significant relation between helicobacter pylori and iron deficiency anemia

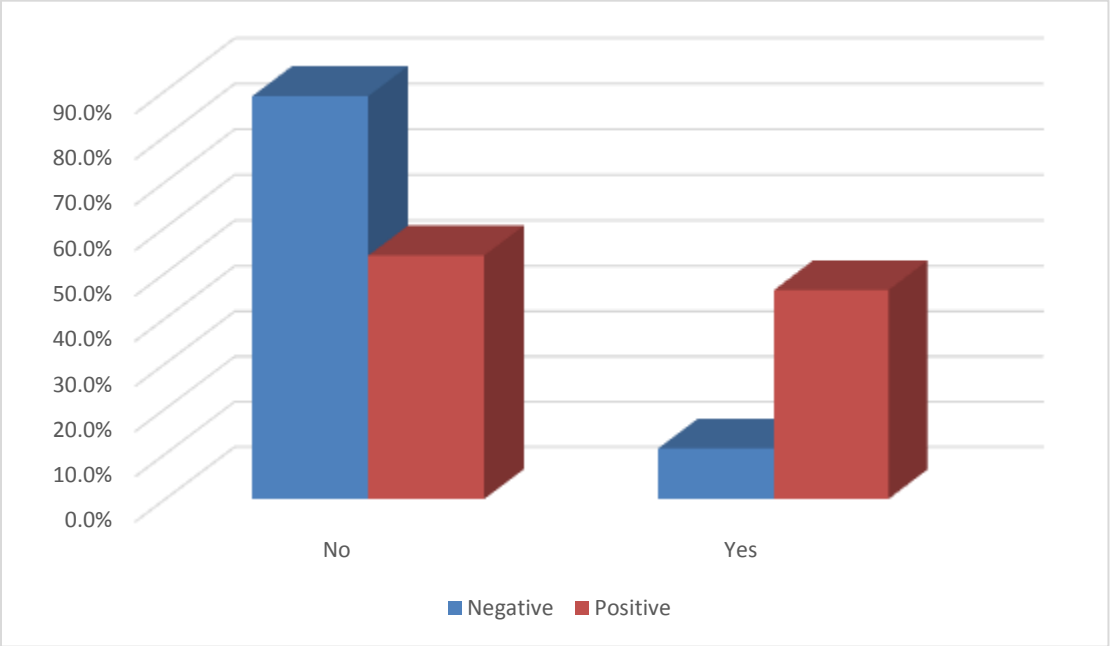

Figure 3: Prevalence of helicobacter pylori among cases with iron deficiency anemia

Table(4): Prevalence of helicobacter pylori among cases with IUGR

IUGR	Helicobacter pylori				Test	p
	-ve		+ve			
No	147	82.6	46	59.0	χ^2= 16.295	<0.001*
Yes	31	17.4	32	41.0		

This table shows that there was statistically significant relation between helicobacter pylori and IUGR

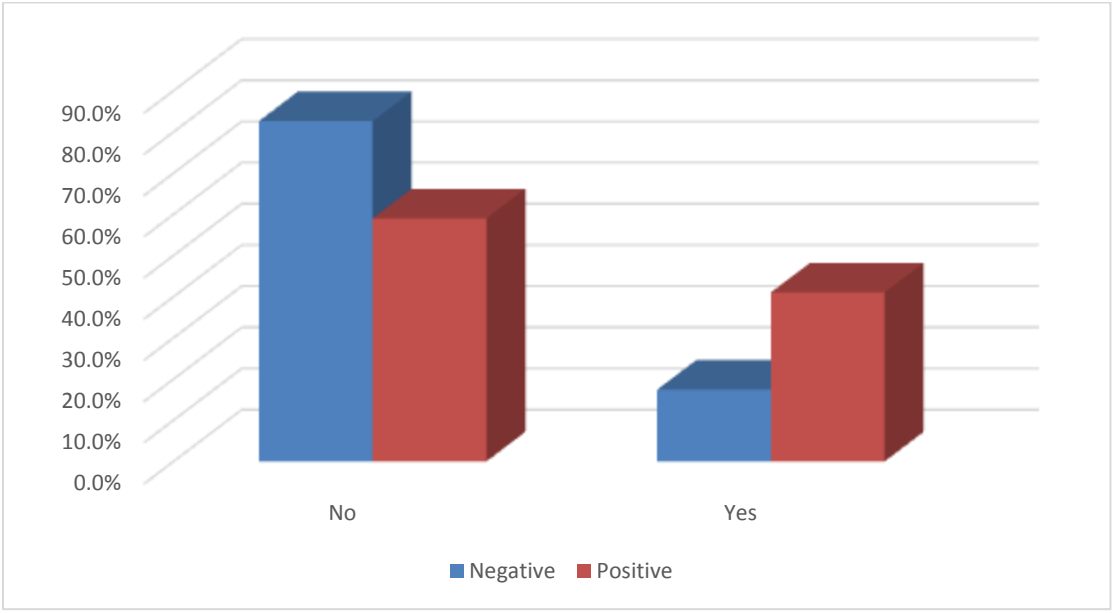

Figure 4: Prevalence of helicobacter pylori among cases with IUGR

Discussion

Helicobacter pylori (HP) is a Gram-negative, spiral-shaped, microaerophilic bacteria that causes inflammation of the stomach lining and inside of the stomach. It is the most common bacterial illness infecting about half of the individuals in developed countries and 80% of people in underdeveloped ones. H. pylori infection is known to cause duodenal and gastric ulcers, as well as being a major risk factor for stomach cancer. Peptic ulcer, adenocarcinoma, and stomach lymphoma are all linked to this illness. H. pylori is classified as a Class 1 carcinogen by the World Health Organization **(8)**

Because of decreased gastric acid production during early pregnancy, which results in increased accumulation of a woman's body fluid, steroid hormone changes, and immunologic tolerance could lead to the activation of latent H. pylori infection, which can exacerbate nausea and vomiting; pregnancy increases susceptibility to H. pylori infection. Pregnant mothers are the most sensitive to the infection; epigastric pain/dyspepsia, flatulence, fullness, nausea, vomiting, anemia, fetal development restriction, fetal abnormalities, and low birth weight are all clinical signs of H.pylori infection. Early pregnancy nausea and vomiting are frequent, affecting 50%–90% of pregnant women in the first half of their pregnancy, and can have a significant impact on maternal health and quality of life **(9).**

all the studied cases were married, among the studied group there were 176 (68.8%) not working and 80 (31.2%) working and there were 157 (61.3%) rural residents and 99 (38.7%) urban residents.

Also, in the study of **Abdella et al., (10),** out of the total sample size (241), 236 pregnant women were included with a respondent rate of 97.93%. Nearly half 109 (46.2%) of the women were within the age group 25–32 years. A majority of the study participants were married 222 (94.1%), and few of them 14 (5.9 %) were divorced. More than half of the participants (59.3%) were urban residents.

The present study showed that the mean gestational age was 25.71 (±4.90 SD) with range (18-34), the mean parity was 2.02 (±1.62 SD) with range (0-5), among the studied group there were 47 (18.4%) who had early menarche, 34 (13.3%) with previous abortion and 147 (71%) had previous CS and 6 (29%) had NVD.

In the study of **Abdella et al., (10),** among all pregnant women, 152 (64.4%) were multigravida, and 84 (35.6%) were primigravida. A majority of the women 104 (68.4%) had inter-pregnancy gap of more than two years. More than half of the pregnant women 123 (52.1%) were in their third trimester followed by those in their second 74 (31.4%) and in their first 39 (16.5%).

The current study showed that among the studied cases there were 188 (73.4%) with no comorbidities, 33 (12.9%) who had hypertension and 35 (13.7%) who had DM, 121 (47.3%) with history of gastrointestinal illness, 56 (21.9%) with anemia, 9 (3.5%) with Allergy to medication and 18 (7%) with previous induction of ovulation and 63 (24.6%) with IUGR.

While, in the study of **Xu et al., (11),** the overall prevalence of underlying diseases was 30.2% (5,374/12,417), including 11.7% with diabetes, 25.1% with hypertension and 4.6% with coronary heart disease.

Whereas, **Kitila et al., (12)** revealed that study participants showed that 71 (21.3%) of them had different intestinal parasites, 190 (57.2%) of them had history of gastrointestinal illness, 61 (18.4%) were anemic, and 145 (74.5%) were pregnant women with hyperemesis gravidarum.

In the study in our hands, among the studied cases there were 78 (30.5%) who had helicobacter pylori.

The prevalence in this study was higher than that reported by **Yisak et al., (13),** as they revealed that the prevalence of H. pylori infection was 17.9% with 95% (CI: 13.4%–22.3%), higher than other countries; 22.1% in Denmark, but, lower than that 43.6% in Thailand, 46.8% in Democratic republic

of Congo (DRC) and 40.9% in Egypt **(14).** These differences might be attributable to differences in time trend of studies, poor personal and environmental hygiene, low socioeconomic status and behavioral factors; and sensitivity/specificity of laboratory tests employed in detecting H.pylori. Stool antigen and serological tests were the most widely used methods used in detecting H.pylori infection.

In this study burden of H. pylori infection among pregnant women is lower than study reported 45.2% in Uganda and 52.4% in Belgium, Brussels **(15).** However, this study finding is higher than studies conducted in France and Zanzibar that reported a prevalence of 21.5% and 17.5%, respectively **(16).** The variation might be due to the difference in study settings, study population, and the laboratory method. In the study of Uganda and Belgium, Brussels, serological antibody test was used as compared to the current study. In the current study burden of H. pylori infection among pregnant women was similar to study reported 33.3% in US-Mexico and 24.1% in Nigeria **(17).**

Iron deficiency is the most common nutritional deficiency in the world and results in impairment of immune, cognitive and reproductive functions, as well as decreased work performance. Iron deficiency anemia (IDA) affects more than a billion people worldwide and contributes to up to 40 percent of maternal deaths in the developing countries. In a typical singleton pregnancy, the average daily demand for iron is approximately 4.4 mg. A supplementation is needed when diet alone cannot supply this amount of iron, but despite iron supplementation, many women continue to remain anemic **(18).**

In the study in our hands, there was statistically significant relation between helicobacter pylori and iron deficiency anemia.

In accordance with our results, study of **Hagras et al., (19)** as they reported that the incidence of IDA was significantly higher in the studied H. Pylori-positive group (34.9%) compared to H. Pylori-negative controls (19.3%,), (P=0.01).

The association between H. pylori infection and anaemia has been explored by previous epidemiological studies in different settings **(20).** Anaemia is considered as a complication of H. pylori infection. Xu et al., 2017 found that the subjects with H. pylori infection had higher prevalence of anaemia, especially in female subjects. A meta-analysis held by **Hudak et al., (21),** found a borderline significant and weak positive association between H. pylori infection and anaemia with a pooled OR of 1.15 (95% CI: 1.00, 1.32).

The current study showed that there was statistically significant relation between helicobacter pylori and IUGR.

Our results were supported by study of Shabana et al., 2016 as they reported that a significantly higher percentage of women who were positive for Helicobacter pylori stool antigen (HPSA) were found among PE cases complicated by IUGR (76%) compared with uneventful pregnancies (32%) ($P < 0.001$).

The study results were also consistent with that of **Cardaropoli et al., (22),** which was conducted on 111 pregnant women after dividing them into two groups: one group was the control and comprised 49 uneventful pregnancies and the other group comprised 62 women having pathological pregnancies complicated by fetal growth restriction (IUGR-only, n = 13), PE (PE-only, n = 17), or both (PE-IUGR, n = 32); it was found that H. pylori seropositivity was significantly more frequent in PE women with or without FGR (85.7%) ($P < 0.001$; OR = 9.22, 95% CI = 2.83-30.04), whereas it did not differ between IUGR-only (46.2%) and controls (42.9%). Further subdivision of the PE group showed a higher prevalence of seropositive subjects among PE-IUGR cases (93.8%) ($P < 0.001$; OR = 35.56, 95% CI = 5.22-242.43) compared with controls, whereas in the PE-only group the percentage of H. pylori-seropositive women was higher, but not statistically significant (70.6%), relative to controls.

The present study had some limitations. Lack of control group is the main limitations. Also, it is a single a center study

Conclusion:

H. pylori infection was investigated not only in association with gastrointestinal manifestations during pregnancy but also with other severe pregnancy-related disorders. There was statistically significant relation between helicobacter pylori and iron deficiency anemia & IUGR.

Conflict of Interest: None

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