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ORIGINAL ARTICLE

Helicobacter Pylori Infection among Pregnant Women with Different Obstetric Problems

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ABSTRACT

Background: Infection with Helicobacter pylori (*H. pylori*) is being studied in gastrointestinal illnesses, especially during pregnancy. Pregnant women are at risk for *H. pylori* infection. Infants may experience nausea, anemia, vomiting, fetal development abnormalities, and low birth weight due to the disease. This study aimed for early diagnosis of *H. pylori* infection among pregnant women with different obstetric problems at Zagazig University hospitals.

Methods: This cross-sectional study was conducted in the Obstetrics & Gynecology and Microbiology departments, Faculty of Medicine, Zagazig University, on 256 pregnant women. *H. pylori* antigen in the stool is a definite indicator of bacterial colonization in the gastrointestinal tract.

Results: About 78 (30.5%) pregnant cases had Helicobacter pylori. There was a high statistically significant relation between *H. pylori* and many obstetric problems such as hyperemesis gravidarum, iron deficiency anemia, IUGR, and preeclampsia ($p<0.001$, $p<0.001$, $p<0.001$, and $p=0.002$ respectively).

Conclusions: This study reported a significant correlation between *H. pylori* and other obstetric issues, such as emesis gravidarum, iron deficiency anemia, IUGR, and preeclampsia, which is consistent with the findings of many prior investigations. Considering the complexities of these diseases' etiological variables and *H. pylori* infection.

Keywords: Helicobacter Pylori; Infection; Pregnancy; Obstetrics

INTRODUCTION

Helicobacter pylori (*H. pylori*) is a gram-negative bacillus that colonizes the stomach and contributes to the development of many gastrointestinal diseases, making it the most common chronic infection worldwide [1]. Developing nations experience it more frequently than industrialized countries. *H. pylori* infection is more common in nations with high stomach cancer rates, and decreasing the frequency of this pathogen has decreased the risk of gastric cancer in industrialized nations [2].

Pregnancy is a physiological condition characterized by biochemical and anatomical changes to sustain the growing baby. Infection with *H. pylori* during pregnancy is also one of the leading causes of iron deficiency anemia, deformity, miscarriage, and growth limitation [3,4].

These pregnancy-associated diseases are potentially fatal infections for both the pregnant woman and the fetus [5]. *H. pylori* infection before pregnancy had remarkable negative effects on the mother's health (organ injury, nutritional deficiency, and even death)

and fetus (malformation, growth abnormalities, and death). In addition, other consequences could be observed later. These effects are due to the immunological and hormonal changes due to pregnancy that activate previous infections by *H. pylori* [6].

Half of people worldwide have stomach infections caused by *H. pylori*, which is more common in underdeveloped nations. The frequency of this infection is influenced by several social and economic factors, such as income, living arrangements for children, squalor, and overcrowding. The prevalence of *H. pylori* during pregnancy varies greatly by location of the world [7].

The main target of our study was the early diagnosis of *H. pylori* infection among pregnant women with different obstetric problems at Zagazig University hospitals.

METHODS

This cross-sectional study was done from February 2021 to August 2022 at the Obstetrics & Gynecology and Microbiology departments, Faculty of Medicine, Zagazig University, after review and approval by the institutional review board (Zu-IRB) committee at the Faculty of Medicine (IRB reference number (6558)).

Written informed consent was obtained from all participants or their first-degree relatives. The work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans.

Inclusion criteria: Cases with hyperemesis, gravidarum, iron deficiency anemia (IDA), preeclampsia, IUGR, and pregnant women with a history of gastrointestinal illness were included.

Exclusion criteria: Cases with the following criteria were excluded from the study: cases with a history of peptic ulcer or pre-pregnancy *H. pylori* eradication, chronic drugs intake, thyroid disorders, psychiatric problems, urinary tract infections, liver or renal disorders, diabetes mellitus, and not taking antibiotics or metronidazole.

All cases were subjected to a complete history taken with special emphasis on personal history, complaints of each woman, menstrual and obstetric history, contraceptive history, and familial infertility or consanguinity. In addition, the history of any medical problems.

The clinical examination included vital signs, weight, height, BMI, an abdomen examination for fetal heart sounds, and fundal level evaluation.

Cases also had an evaluation of fetal well-being, including abdominal ultrasound to confirm viability, check for gestational age, biometry of the fetus, site of the placenta and amniotic fluid index and evaluation of estimated fetal weight. Furthermore, CTG - FHR pattern and uterine activity were assessed.

Lab evaluation included complete blood count, liver functions (SGOT, SGPT, serum albumin, total bilirubin), urine examination, especially for proteinuria, blood glucose level, and 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 using

ELISA kit enzyme (immunoassay of *H. pylori* antigen in human stool for in vitro diagnosis, catalogue No-PT-H.pylori.S.Ag).

STATISTICAL ANALYSIS

Data was analyzed using SPSS version 20.0. Numbers and percentages were utilized to describe qualitative facts. To confirm the normality of the distribution, the Kolmogorov-Smirnov test was utilized. The quantitative data's range, mean, standard deviation, and median were used. When comparing various groups using categorical data, chi-square is employed. When comparing two groups under study, the Student t-test is employed for quantitative variables with normally distributed distributions. The results were significant, with $p<0.05$.

RESULTS

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 **(Table 1)**.

The mean gestational age (GA) was 25.71 (±4.90 SD) with range (18-34), the mean parity was 2.02±1.62 child 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 **(Table 2).** Among the studied cases, there were 188 (73.4%) with no comorbidities, 33 (12.9%) who had hypertension, 35 (13.7%) who had DM, 121 (47.3%) with a history of gastrointestinal illness, 173 (67.6%) with hyperemesis gravidarum (HEG), 56 (21.9%) with IDA, 9 (3.5%) with an allergy to medication, and 18 (7%) with previous induction of ovulation, 29 (11.3%) with preeclampsia (PE), and 63 (24.6%) with IUGR **(Table 3)**.

Respecting our findings, there were 78 (30.5%) who had Helicobacter pylori **(Table 4).**There was a high statistically significant relation between *H. pylori* and many obstetric problems such as hyperemesis gravidarum, iron deficiency anemia, IUGR, and preeclampsia ($p<0.001$, $p<0.001$, $p<0.001$, and $p=0.002$ respectively) **(Tables 5 and 6).**

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

Table 2: Descriptive of studied cases according to obstetric history

Cases (n=256)		
Gestational age		
Range	18.0 – 34.0	
Mean ± SD	25.71 ± 4.90	
Parity		
Range	0.0 – 5.0	
Mean ± SD	2.02 ± 1.62	
Early menarche	**No.**	**%**
No	209	81.6
Yes	47	18.4
Previous abortion		
No	222	86.7
Yes	34	13.3
Mode of delivery	**(n=207)**	
CS	147	71.0
NVD	60	29.0

Table 3: Descriptive of studied cases according to medical history

	Cases	
Comorbidity	**No.**	**%**
Non	188	73.4
HTN	33	12.9
DM	35	13.7
Allergy to any medication		
No	247	96.5
Yes	9	3.5
Previous induction of ovulation		
No	238	93.0
Yes	18	7.0
History of gastrointestinal illness		
No	135	52.7
Yes	121	47.3
Hyperemesis gravidarum		
No	83	32.4
Yes	173	67.6
Iron deficiency anemia		
No	200	78.1
Yes	56	21.9
Preeclampsia		
No	227	88.7
Yes	29	11.3
IUGR		
No	193	75.4
Yes	63	24.6

Table 4: Prevalence of Helicobacter pylori among the studied cases

	Cases	
Helicobacter pylori	No.	%
Negative	178	69.5
Positive	78	30.5

Table 5: Relation between Helicobacter pylori and demographic data

Demographic data	**Helicobacter pylori**				**Test**	**p**
	No		Yes			
Age (years)						
Range	22 – 36		22 – 36		t=2.404	0.017*
Mean ± SD	29.56 ± 4.4		28.14 ± 4.19			
Occupation						
Not working	122	68.5	54	69.2	χ^2=0.012	0.913
Working	56	31.5	24	30.8		
Residence						
Rural	115	64.6	42	53.8	χ^2=2.648	0.106
Urban	63	35.4	36	46.2		

Table 6: Prevalence of Helicobacter pylori among cases with history of gastrointestinal illness, hyperemesis gravidarum, iron deficiency anemia, preeclampsia, and IUGR

	Helicobacter pylori				**Test**	**p**
	-ve		**+ve**			
History of gastrointestinal illness						
No	100	56.2	35	44.9	χ^2=2.782	0.095
Yes	78	43.8	43	55.1		
Hyperemesis gravidarum						
No	79	44.4	4	5.1	χ^2=38.141	<0.001*
Yes	99	55.6	74	94.9		
Iron deficiency anemia						
No	158	88.8	42	53.8	χ^2=38.693	<0.001*
Yes	20	11.2	36	46.2		
Preeclampsia						
No	165	92.7	62	79.5	χ^2=9.421	0.002*
Yes	13	7.3	16	20.5		
IUGR						
No	147	82.6	46	59.0	χ^2=16.295	<0.001*
Yes	31	17.4	32	41.0		

DISCUSSION

H. pylori infection is an etiological factor for gastric and duodenal ulcers and a high-risk factor for stomach cancer. This pathogen has been associated with peptic ulcer, adenocarcinoma, and stomach lymphoma. The WHO has categorized *H. pylori* as a Class 1 carcinogen [8].

Our demographic findings were validated by the study of Yisak et al. [9], reporting that the mean age was 26.59±4.23 years (18-40 years). Regarding residence, 22.1% lived in cities, while 77.9% lived in rural areas.

Also, according to Abdella et al. [10], 236 pregnant women were included in the total sample size (241), with a response rate of 97.93%. The women's average age was 26.9±6.3 years. Almost 46.2% of the women were between 25 and 32. The bulk of research participants (94.1%) were married. More than half of the cases were city dwellers.

Our results showed that the mean GA was 25.71±4.90 weeks (range 18-34), and the mean parity was 2.02±1.62 child; among the studied group, there were 18.4% who had early menarche, 13.3% with previous abortion, 71% had previous CS, and 29% had NVD.

While in the study of Kitila et al. [11], 44.6% had their first pregnancy, and 28.7% had their second time. 60% of cases of fetuses had a GA of 1-12 weeks and 31.7% of cases of fetuses with GA of 13-24 weeks.

In the study of Abdella et al. [10], 64.4% of the pregnant women were multigravida, whereas 35.6% were primigravida. Most women (68.4%) had a two-year interval between pregnancies. 52.1% were in their third trimester, 31.4% were in their second, and 16.5% were in their first.

Our findings revealed that 73.4% with no comorbidities, 12.9% had hypertension, 13.7% had DM, 47.3% with a history of gastrointestinal illness, 67.6% with hyperemesis gravidarum, 21.9% with anemia, 3.5% with an allergy to medication, 7% with previous induction of ovulation, 11.3% with preeclampsia, and 24.6% with IUGR.

While in the study of Xu et al. [12], the total incidence of disorders was 30.2%, with diabetes accounting for 11.7%, hypertension accounting for 25.1%, and coronary heart disease accounting for 4.6%.

Whereas, Kitila et al. [11] revealed that study participants showed that 74.5% had hyperemesis gravidarum, 57.2% of cases had a history of gastrointestinal diseases, 21.3% had different intestinal parasites, and 18.4% were anemic.

In the study in our hands, among the studied cases, there were 78 (30.5%) who had Helicobacter pylori. *H. pylori* incidence was much elevated than that of Yisak et al. [9], as they revealed that the incidence of *H. pylori* was 17.9%, which was higher than in other countries. In Denmark, the incidence is 22.1%, but it is lower. Thailand had 43.6%, the Democratic Republic of the Congo (DRC) had 46.8%, and Egypt had 40.9% [13]. These variations could be attributed to changes in study time trends, poor environment, personal hygiene, low socioeconomic status and behavioural variables, and the sensitivity/specificity of laboratory tests used to diagnose *H. pylori*. The most commonly utilized *H. pylori* infection detection procedures were stool antigen and serological testing.

This study found a lower *H. pylori* infection incidence than earlier reports, 45.2% in

Uganda and 52.4% in Belgium [14,15]. However, our finding is greater than those in France and Zanzibar, which revealed incidence rates of 21.5% and 17.5%, respectively [16,17]. The variance could be attributed to differences in the study population, conditions, and laboratory procedures. Compared to the current investigation, serological antibody tests were used in Uganda and Belgium, Brussels. In addition, our results were similar to previous studies that reported 33.3% in the US-Mexico and 24.1% in Nigeria [18,19].

The present study revealed no remarkable relationship between *H. pylori* and a history of gastrointestinal illness.

In the study of Yisak et al. [9], gastrointestinal issues affected 65.4% of *H. pylori*-positive mothers, who also experienced symptoms like abdominal pain (36.54%), loss of appetite (19.23%), hiccups (17.31%), and diarrhea and abdominal cramps (1.92%), which is worse when the stomach is empty, and frequent heartburn (25%) during the current pregnancy [9].

Also, Kitila et al. [11] revealed that 34.7% of women infected with *H. pylori* had a history of gastrointestinal diseases.

The present results showed a marked link between Helicobacter pylori and HEG. In accordance with Elmahdy et al. [20] investigation, *H. pylori* was detected in stool samples of 75% of HEG cases and 37.50% of normal pregnant women ($p<0.01$).

Only two studies examined the link between cytotoxin-associated gene (CagA)-positive *H. pylori* and pregnant gastrointestinal issues. The first study showed a significant correlation between CagA-positivity and dyspepsia in pregnancy, despite the fact that *H. Pylori*prevalence was marginally high in pregnant females with dyspeptic cases compared to controls [21]. The second study reported that *H. pylori* and CagA-positive strains in HEG patients were markedly higher than those in asymptomatic pregnant women ($P < 0.01$ for both) [22].

IDA is the most common nutritional deficiency, impairs immunological, cognitive, and reproductive processes, and lowers work performance. Over a billion individuals are affected by IDA, and up to 40% of maternal mortality in poor nations is a result of IDA. The normal daily need for iron is about 4.4 mg during a singleton pregnancy. A supplement is required when the required amount of iron cannot be obtained through diet alone; however, many women still experience anemia even after taking iron supplements [23].

Concerning the current findings, IDA and *H. pylori* had a statistically notable relation.

Anaemia and *H. pylori* infection have been linked in epidemiological studies conducted in various contexts [24]. Hudak et al. [25] had a meta-analysis that revealed a marginally remarkable and positive correlation between anemia and *H. pylori* infection (95% CI: 1.00, 1.32).

Our study found a statistically significant relation between Helicobacter pylori and preeclampsia. Our findings were corroborated by research by Ali et al. [26], who noted a statistically marked elevation in *H. pylori* in the PE group compared to the control group.

Our research supports the findings of a recent report which found a potential association between *H. pylori* infection and PE and assumed that *H. pylori*-infected women are more likely to experience PE than normal

women. Additionally, infection with strains of *H. pylori* that are CagA positive may greatly increase the risk of PE in pregnant women [27].

Moreover, Tsegaye et al. [28] revealed that all cases had an overall *H. pylori* infection incidence of 38.9%. Infection with *H. pylori* was more common in PE cases than in controls. A link between *H. pylori* infection and PE was discovered using non-preeclamptic as a comparison.

The current study showed a statistically significant relation between *H. pylori* and IUGR. Our results agreed with Shabana et al. [29] as they reported that regarding *H. pylori* stool antigen positivity, 32% of cases were normal pregnancies, and 76% were pregnant cases with PE complicated with IUGR ($P < 0.001$).

Our results showed a marked relation between Helicobacter pylori and age. Our findings have been confirmed by a study by Kitila et al. [11], who found no statistically marked correlation between sociodemographic and *H. pylori* infection, as well as some expected behavioural and clinical risk factors, such as alcohol and tobacco use, tea and coffee consumption, gravidity, gestational period, parity, and intestinal parasite presence. There was a marked correlation between *H. pylori* infection and patients' anemia levels, history of gastrointestinal sickness, pregnancy status, and history of hyperemesis gravidarum in pregnant women [11].

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

CONCLUSIONS

This study reported a remarkable correlation between *H. pylori* and other obstetric issues, such as emesis gravidarum, iron deficiency anemia, IUGR, and preeclampsia, consistent with many prior investigations' findings. Considering the complexities of these diseases' etiological variables and *H.pylori* infection.

Conflict of Interest: None

Financial Disclosures: None

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