Check for updates

OPEN ACCESS

DOI: 10.46903/gjms/23.1.1807

ORIGINAL ARTICLE

NAUSEA AND VOMITING IN FIRST-TRIMESTER PREGNANCY: IS HELICOBACTER PYLORUS A RISK FACTOR?

Nizheen Shaban Qader[1], Maida Yousif [2], Ala Yousif Mahmood[2]

[1]Department of Obstetrics & Gynecology, Maternity Teaching Hospital, Duhok city, Kurdistan region.
[2]Department of Obstetrics & Gynecology, College of Medicine, University of Duhok– Duhok city, Kurdistan region, Iraq.

ABSTRACT

Background: Nausea and vomiting in pregnancy could lead to adverse fetal and maternal outcomes. The aim of this study was to investigate the association between Helicobacter pylori infection and both the frequency and severity of nausea and vomiting in pregnant women before 20 weeks of gestation.

Materials & Methods: This descriptive cross-sectional study was conducted on all one hundred pregnant women with nausea and vomiting during the study period, from May 1, 2022, to April 30, 2023, in the Obstetrics and Gynecology Department of the Maternity Teaching Hospital in Dohuk, Kurdistan Region of Iraq. The H.pylori infection was assessed through IgG testing by ELISA.

Results: The H. Pylori test was positive in 56% of pregnant women with Nausea and Vomiting (N&V). There was a highly significant association between cesarean section and pregnant women with preterm birth. There was a significant association between increased age and gestational age of pregnant women with N&V and positive H. Pylori test ($p<0.05$). There was a highly significant association between normal General Urine Examination (GUE) of pregnant women with N&V and positive H. Pylori test ($p<0.001$).

Conclusions: The prevalence of H. pylori infection among pregnant women with nausea and vomiting is high.

KEY WORDS: Nausea; Vomiting; Pregnancy; H. pylori; Infection.

Cite as: Qader NS, Yousif M, Mahmood AY. Nausea and vomiting in first trimester pregnancy; is helicobacter pylorus a risk factor?. Gomal J Med Sci 2025 Jan-Mar;23(1):34-9. https://doi.org/1046903/gjms/23.1.1807

INTRODUCTION

The nausea and vomiting in pregnant women or 'morning sickness', is reported for about 50–80% of pregnant women in the first trimester.[1] Nausea and vomiting are commonly shown between the 4th to 8th weeks of pregnancy and might continue to the 20th or 22nd weeks.[2] Generally, it is a mild and self-limited condition. However, it could deteriorate more severe symptoms which is called hyperemesis gravidarum (HG).[1] The HG is defined as persistent nausea and vomiting in pregnancy associated with ketosis and weight loss. The HG, especially in severe cases may lead to dehydration, electrolyte imbalance, acid-base disturbance, deficient nutrition, and mortality in severe cases. Hospitalization for HG severe cases is reported in about 0.3-2% of pregnant women.[3] The prevalence of HG is ranged between 0.3 to 1.5% of all pregnancies.[4]

The exact pathogenesis of nausea and vomiting in pregnancy is not fully understood till now. However, the etiology is likely multi-factorial including different factors such as hormonal disturbances, psychological factors, gastrointestinal disturbances, infection, immune responses, metabolism abnormalities, and anatomic changes.[5] At first and second trimesters of pregnancy, the HG is the main cause of hospitalization and the HG is the second cause after preterm labor for pregnancy hospitalization in general. Hyperemesis gravidarum

Corresponding Author:
Dr. Nizheen Shaban Qader
Department of Obstetrics & Gynecology
Maternity Teaching Hospital
Duhok city, Kurdistan region, Iraq
E-mail: nejeenshaban@gmail.com

Date Submitted: 06-03-2024
Date Revised: 11-01-2025
Date Accepted: 20-01-2025

could be related to severe maternal co-morbidities like encephalopathy and fetal co-morbidities like intrauterine growth retardation and fetal mortality.[4]

Helicobacter pylori (H. pylori) or Campylobacter pyloridis are gram-negative bacteria regarded as the main cause of gastritis and the commonest risk factor of peptic ulcers. Additionally, H. pylori plays a major role in the etiology of stomach lymphoma and carcinoma.[6] The prevalence of these bacteria in poor countries reached 70 to 90% of the population, while in rich countries the H. pylori prevalence reached about 25 to 50% of the population.[4] Diagnosis of H. pylori included different non-invasive tests like blood antibody test, stool antigen test, and carbon urea breath test. An invasive diagnostic method for H. pylori is by endoscopic biopsy, histology inspection, and culturing.[7] However, serology testing is highly sensitive, simplest, and less expensive than biopsy.[8] H. pylori infection among pregnant women that is acquired before pregnancy is activated with immunological and hormonal changes during pregnancy. The H. pylori infection had many adverse effects on fetal and maternal health status.[9] The association between H. pylori infection and vomiting and nausea at earlier weeks of gestation might be attributed to fluid replacement caused by elevated steroid hormones that also stimulate PH alteration like acidity variances that may induce H. pylori infection activation. Another explanation for this association is the reduced defensive mechanism against H. pylori infection and low gastrointestinal motility during gestation.[10] The aim of this study was to investigate the association between Helicobacter pylori infection and both the frequency and severity of nausea and vomiting in pregnant women before 20 weeks of gestation.

MATERIAL & METHODS

A Descriptive cross-sectional study was carried out in the Obstetric department of Maternity Teaching Hospital in Duhok city-Kurdistan region/ Iraq through the interval from 1st of May, 2022 till 30th of April, 2023. The studied population was all pregnant women who presented or were admitted to the Obstetric department of the hospital with nausea and vomiting during the study duration. A sample of 100 pregnant women with nausea and vomiting (N&V) were selected by convenience sampling after meeting inclusion and exclusion criteria. Inclusion criteria were pregnant women aged 18-42 years old, gestational age of fewer than 20 weeks confirmed by ultrasound, excessive pregnancy-related nausea and/or vomiting that prevents adequate intake of food and fluids, measuring weight loss (>5% of pre-pregnancy weight), signs of dehydration, ketonuria (+1 or more) and hemoconcentration (normal female hematocrit value 36.1-44.3%). Exclusion criteria were hydatidiform molar pregnancy, thyroid dysfunction, gastroenteritis, cholecystitis, pyelonephritis, and liver dysfunction. The research protocol was approved by the Ethics Committee of the Kurdistan Higher Council of Medical Specialists, approval from hospital authorities, and oral informed consent of women.

The data of women was filled in a prepared questionnaire designed by the researchers after direct interviews with selected women. The questionnaire contained general characteristics of pregnant women with N&V (age, residence, gravidity history, parity history, miscarriage history, gestational age, and previous mode of delivery) and Investigation findings of pregnant women with N&V (N&V severity, complete blood count, H.pylori infection and general urine examination finding). All cases were subjected to the following: full history taking, clinical examination, transabdominal or transvaginal pelvic sonogram, laboratory investigations including complete blood count, serum electrolytes, liver and kidney function tests, urine analysis, thyroid functions, and H.pylori IgG testing by ELISA.

The collected data were entered and interpreted statistically by SPSS program 26. Suitable statistical tests (Chi-square and Fisher's exact tests) were used for categorical variables. The p-value of $\leq$ 0.05 was regarded as significant.

RESULTS

This study included one hundred pregnant women with Nausea & Vomiting (N&V) presented with a mean age of 28.6±5.5 years; 53 (53%) of them were in the age group 20-29 years. Most of the pregnant 89 (89%) women with N&V were living in the urban areas. More than half 55 (55%) of pregnant women had a gravidity history of 2-4, while 62 (62%) of them had a parity history of 1-4 and 23 (23%) of them had positive miscarriage history. The mean gestational age of pregnant women with N&V was 8.6±2.7weeks; 62 (62%) of them had gestational age of less than 10 weeks. The cesarean section history was the previous mode of delivery for 7 (10%) of pregnant women with N&V. (***Table 1***)

The severity of N&V was distributed as follows; grade 0 21 (21%), grade I 55 (55%), grade II 18 (18%), and grade III 6 (6%). The CBC was normal in all studied pregnant women with N&V. The H. Pylori test was positive in 56 (56%) of pregnant women with N&V. The general urine examination was abnormal in 30 (30%) of pregnant women with N&V. (***Table 2***)

Table 1: General characteristics of pregnant women with N&V.

Variable	No.	%age
Age (years)	28.6±5.5*	
<20 years	4	4.0
20-29 years	53	53.0
30-39 years	41	41.0
≥40 years	2	2.0
Residence		
Urban	89	89.0
Rural	11	11.0
Gravidity history		
Primi-gravida	28	28.0
Gravida 2-4	55	55.0
Gravida ≥5	17	17.0
Parity history		
Nulliparous	30	30.0
Para1-4	62	62.0
Para≥5	8	8.0
Miscarriage history		
Yes	23	23.0
No	77	77.0
Gestational age (weeks) weeks*	8.6±2.7*	
<10 weeks	62	62.0
≥10 weeks	38	38.0
Previous mode of delivery		
Vaginal delivery	63	90.0
Cesarean section	7	10.0
Total	100	100.0

* mean ±SD

Table 2: Investigations findings of pregnant women with N&V.

Variable	No.	%age
Severity of nausea and vomiting		
Grade 0	21	21.0
Grade I	55	55.0
Grade II	18	18.0
Grade III	6	6.0
Complete blood count		
Normal	100	100.0
Abnormal	0	-
H. Pylori test		
Positive	56	56.0
Negative	44	44.0
General urine examination		
Normal	70	70.0
Abnormal	30	30.0
Total	100	100.0

There was a significant association between the increased age of pregnant women with N&V and positive H. Pylori test (p=0.05), Among the 56 women who tested positive for H. Pylori, 28 (50%) were in the 20-29 age group, 26 (46.4%) were in the 30-39 age group, and 2 (3.6%) were in the ≥40 age group, while among 44 women who tested negative, 4 (9.1%) were in the <20 age group, 25 (56.8%) were in the 20-29 age group, and 15 (34.1%) were in the 30-39 age group. No significant differences were observed between pregnant women with positive H. Pylori test and pregnant women with negative H. Pylori test regarding residence (p=0.06), gravidity (p=0.18), parity (p=0.19), miscarriage (p=0.9), and previous mode of delivery (p=0.28). A significant association was observed between increased gestational age of pregnant women with N&V and positive H. Pylori test (p=0.01), Among women with positive tests, 29 (51.8%) women had a gestational age of <10 weeks, and 27 (48.2%) women had a gestational age of ≥10 weeks, while among women with negative tests, 33 (75%) women had a gestational age of <10 weeks and 11 (25%) women had a gestational age of ≥10 weeks. (**Table 3**)

Table 3: Distribution of women's general characteristics according to H. Pylori test.

Variable	H. Pylori test				P-value
	Positive (n=56)		Negative (n=44)		
	No.	%	No.	%	
Age					
<20 years	0	-	4	9.1	0.05 S
20-29 years	28	50.0	25	56.8	
30-39 years	26	46.4	15	34.1	
≥40 years	2	3.6	0	-	
Residence					
Urban	47	83.9	42	95.5	0.06 NS
Rural	9	16.1	2	4.5	
Gravidity history					
Primi-gravida	12	21.4	16	36.4	0.18 NS
Gravida 2-4	35	62.5	20	45.5	
Gravida ≥5	9	16.1	8	18.2	
Parity history					
Nulliparous	13	23.2	17	38.6	0.19 NS
Para1-4	39	69.6	23	52.3	
Para≥5	4	7.1	4	9.1	
Miscarriage history					
Yes	13	23.2	10	22.7	0.9 NS
No	43	76.8	34	77.3	
Gestational age					
<10 weeks	29	51.8	33	75.0	0.01 S
≥10 weeks	27	48.2	11	25.0	
Previous mode of delivery					
Vaginal delivery	40	93.0	23	85.2	0.28 NS
Cesarean section	3	7.0	4	14.8	

**P-value Chi-square and Fisher's exact tests, S=Significant, NS=Not significant.*

There was a highly significant association between normal General Urine Examination (GUE) of pregnant women with N&V and positive H. Pylori test (p<0.001), Among women with positive tests, 54 (96.4%) women had a normal GUE and 2 (3.6%) women had an abnormal GUE, in women with negative tests, 16 (36.4%) women had a normal GUE and 28 (63.6%) women had an abnormal GUE. While a significant association was found between H. pylori infection and the presence of nausea and vomiting among pregnant women, no significant correlation was observed between H. pylori infection and the severity of nausea and vomiting (p=0.3). This suggests that although H. pylori may contribute to the occurrence of nausea and vomiting, it does not appear to influence their severity. (***Table 4***)

Table 4: Distribution of investigation findings according to H. Pylori test.

Variable	H. Pylori test				P-value
	Positive (n=56)		Negative (n=44)		
	No.	%	No.	%	
Severity of nausea and vomiting					
Grade 0	9	16.1	12	27.3	0.3 NS
Grade I	31	55.4	24	54.5	
Grade II	13	23.2	5	11.4	
Grade III	3	5.4	3	6.8	
General urine examination					<0.001 S
Normal	54	96.4	16	36.4	
Abnormal	2	3.6	28	63.6	

**P-value Chi square test, S=Significant, NS=Not significant.*

DISCUSSION

The complications of nausea and vomiting, if left untreated, can be serious maternal and fetal ones. Identification of risk factors is an important concern in management planning to improve the quality of life.[3]

The mean age in the current study reported the age of pregnant women with N&V as 28.6 years and 53% were within the age group 20-29 years. This finding is close to the results of Shahab and Hamadamin's study[11], which reported that 60% of pregnant women with N&V were in the 20-29 age group. The maximum risk of nausea and vomiting in pregnancy, according to a recent Indonesian study, occurs at the age of 20-35 years, while the lower risk was at younger or older maternal ages.[12]

Our study found that 89% of pregnant women with N&V were urban residents. A study conducted by Fejzo and Trovik reported that nausea and vomiting in pregnancy are more common in urban areas.[13]

In our study, over half of the pregnant women had a history of gravidity of 2-4. On the other hand, 62% of them had a parity history of 1-4, while 23% had a positive miscarriage history. These results are in line with the outcome of various studies that have found the impact of gravidity, parity, and pregnancy loss on the incidence of nausea and vomiting in pregnancy. [14,15]

Our study found that 62% of pregnant women with N&V had a gestational age of less than 10 weeks. The finding coincides with the results of Zhu's study.[16] The history of cesarean section in the current study showed that 10% of pregnant women with N&V had a previous C-section. Similarly, research conducted [17] recorded that the occurrence of nausea and vomiting in pregnancy increased after a cesarean section delivery.

The severity of N&V in the current study was as follows: grade 0 comprised 21%, grade I 55%, grade II 18%, and grade III 6%. This is in closeness with findings from Jin et al. in their meta-analysis, where the N&V severity among pregnant women was specified as grade 0 (40%), grade I (46%), grade II (10%), and grade III (4%).[18]

The interesting finding in the present study was that, out of pregnant women with N&V, 56% tested positive for H. pylori. As a matter of fact, this coincides with various literature showing the significant role of H. pylori in the development of nausea and vomiting in pregnancy.[19,20]

Our study demonstrated that general urine examination was abnormal in 30% of pregnant women with N&V. Adane showed that the incidence of urinary tract infection contributed to N&V among pregnant women.[21]

In the current study, advanced maternal age significantly influenced having a positive H. pylori test with $p=0.05$.[22] Our study also showed a significant association between increased gestational age in pregnant women with N&V and a positive H. pylori test ($p=0.01$).[23] Massadah reported that H. pylori infection in pregnant women with N&V was more evident with increased gestational age. Furthermore, our study found a highly significant association between normal GUE and a positive H. pylori test ($p<0.001$).[24] Although the results of this study showed a strong correlation between the presence of H. pylori infection and symptoms of nausea and vomiting in the first months of pregnancy, the inverse association of infection with symptom severity should be revisited. The reasons for this difference included individual differences in immune response or pregnancy's hormonal milieu. Heightened steroid hormones cause high gastric pH, where H. pylori can wreak havoc and lead to nausea and vomiting among pregnant women. However, the degree of symptoms may be determined by other attributes in addition to those, such as a genetic risk factor, nutritional health or underlying medical conditions. This study also is limited in that the diagnostic modality used (ELISA-based IgG testing) cannot accurately identify active H. pylori infections and cannot differentiate between chronic (smoldering) and active infections. Further studies using more sensitive and specific diagnostic methods for H. pylori; such as urea breath test or stool antigen tests, are required to accurately elucidate the role of H. pylori in NVP.

CONCLUSION

In conclusion, the prevalence of H. pylori infection among pregnant women with nausea and vomiting is high. Risk factors for H. Pylori infection in pregnant women with nausea and vomiting are increased age and increased gestational age of pregnant women. This study recommended physicians search for H. Pylori infection among pregnant women with nausea and vomiting.

REFERENCES

1. El Tamamy EAr, Abdel Fattah AT, Hemdan MHAI. The relation between Helicobacter pylori seropositivity and hyperemesis gravidarum in pregnant women during first trimester. Egypt J Hosp Med. 2019;77(2):4894-8. https://doi.org/10.21608/ejhm.2019.47454.
2. Cummings MJ, Baldwin MR, Abrams D, Jacobson SD, Meyer BJ, Balough EM, et al. Epidemiology, clinical course, and outcomes of critically ill adults with COVID-19 in New York City: a prospective cohort study. Lancet. 2020;395(10239):1763-70. https://doi.org/10.1016/S0140-6736(20)31189-2.
3. Liu C, Zhao G, Qiao D, Wang L, He Y, Zhao M, et al. Emerging progress in nausea and vomiting of pregnancy and hyperemesis gravidarum: challenges and opportunities. Front Med. 2021;8:809270. https://doi.org/10.3389/fmed.2021.809270.
4. Feng Y, Huang Q, Luo M, Wei J, Gao T, Chu D, et al. The association between Helicobacter pylori and gastrointestinal disorders during pregnancy: a multicenter retrospective study. Helicobacter. 2024;29(1):e13032. https://doi.org/10.1111/hel.13032.
5. Tuzcuoğlu SHAİ, Soysa ME. The prevalence of Helicobacter pylori in the stools of pregnant women with hyperemesis gravidarum. Anatol J Family Med. 2023;6(2):69-74. https://doi.org/10.5505/anatoljfm.2023.27136.
6. Hussein KS. Hyperemesis gravidarum in first-trimester pregnant Saudi women: is Helicobacter pylori a risk factor? Front Physiol. 2020;11:575. https://doi.org/10.3389/fphys.2020.00575.
7. Ghazanfar H, Javed N, Reina R, Thartori O, Ghazanfar A, Patel H. Advances in diagnostic modalities for Helicobacter pylori infection. Life. 2024;14(9):1170. https://doi.org/10.3390/life14091170.
8. Ioannidou P, Papanikolaou D, Mikos T, Mastorakos G, Goulis DG. Predictive factors of hyperemesis gravidarum: a systematic review. Eur J Obstet Gynecol Reprod Biol. 2019;238:178-87. https://doi.org/10.1016/j.ejogrb.2019.04.043.

9. Li J, Fan M, Ma F, Zhang S, Li Q. The effects of Helicobacter pylori infection on pregnancy-related diseases and fetal development in diabetes in pregnancy. Ann Transl Med. 2021;9(8):686. https://doi.org/10.21037/atm-21-1209.
10. Aydın M, Tolunay HE, Varlı EN, Boza B, Şahin Ö, Özer S, et al. Helicobacter pylori infection in amniotic fluid may cause hyperemesis gravidarum. Yale J Biol Med. 2020;93(4):487-93. [PMC7513450].
11. Shahab LS, HA. Relation of Helicobacter pylori and hyperemesis gravidarum in a sample of pregnant women in Maternity Teaching Hospital of Erbil city. AMJ. 2023;8(1):15-21. https://doi.org/10.56056/amj.2023.193.
12. Suhartat S. The relation of age and parity with the incidence of hyperemesis gravidarum in pregnant women in Dr. H. Moch Ansari Saleh Banjarmasin Hospital. Proceedings of the First National Seminar Universitas Sari Mulia, NS-UNISM 2019, 23rd November 2019, Banjarmasin, South Kalimantan, Indonesia; 2020. https://doi.org/10.4108/eai.23-11-2019.2298361.
13. Fejzo MS, Trovik J, Grooten IJ, Sridharan K, Roseboom TJ, Vikanes Å, et al. Nausea and vomiting of pregnancy and hyperemesis gravidarum. Nat Rev Dis Primers. 2019;5(1):62. https://doi.org/10.1038/s41572-019-0110-3.
14. Poeran-Bahadoer S, Jaddoe VWV, Gishti O, Grooten IJ, Franco OH, Hofman A, et al. Maternal vomiting during early pregnancy and cardiovascular risk factors at school age: the Generation R Study. J Dev Orig Health Dis. 2019;11(2):118-26. https://doi.org/10.1017/S2040174419000114.
15. Regodón Wallin A, Tielsch JM, Khatry SK, Mullany LC, Englund JA, Chu H, et al. Nausea, vomiting and poor appetite during pregnancy and adverse birth outcomes in rural Nepal: an observational cohort study. BMC Pregnancy Childbirth. 2020;20(1):545. https://doi.org/10.1186/s12884-020-03141-1.
16. Zhu S, Zhao A, Lan H, Li P, Mao S, Szeto IM-Y, et al. Nausea and vomiting during early pregnancy among Chinese women and its association with nutritional intakes. Nutrients. 2023;15(4):933. https://doi.org/10.3390/nu15040933.
17. Nejadi JR, Shamseh M, Ronasi N, Birjandi M, Karimi A. Comparison of the effects of dexamethasone and ondansetron on the reduction of postoperative nausea and vomiting following cesarean section under spinal anesthesia. Curr Rev Clin Exp Pharmacol. 2021;16(1):117-22. https://doi.org/10.2174/1574884715666200302122800.
18. Jin B, Han Y, Jiang Y, Zhang J, Shen W, Zhang Y. Acupuncture for nausea and vomiting during pregnancy: a systematic review and meta-analysis. Complement Ther Med. 2024;85:103079. https://doi.org/10.1016/j.ctim.2024.103079.
19. Rasin BH, AR. Association between hyperemesis gravidarum in Iraqi women with Helicobacter pylori infection. Egypt J Hosp Med. 2022:5653-9. https://doi.org/10.21608/ejhm.2022.266022.
20. O E. The association between Helicobacter pylori infection and hyperemesis gravidarum. Al-Azhar Int Med J. 2020;1(4):32-6. https://doi.org/10.21608/aimj.2020.22069.1054.
21. Adane KD, Zerga AA, Gebeyehu FB, Ayele FY. Proportion of hyperemesis gravidarum and associated factors among pregnant women admitted into the obstetrics ward at Akesta General Hospital, North East Ethiopia. PLoS One. 2023;18(2):e0281433. https://doi.org/10.1371/journal.pone.0281433.
22. Beyene GA, Ayele ND, Kasahun AW. Prevalence and determinants of hyperemesis gravidarum among pregnant women in Ethiopia: a systematic review and meta-analysis. PLoS One. 2024;19(12):e0314783. https://doi.org/10.1371/journal.pone.0314783.
23. Wang SJ, Hsieh CJ, Su YH, Lin LL, Chen WC, Chen HH, et al. Assessment of adverse pregnancy outcomes associated with Helicobacter pylori infection. Sci Rep. 2024;14(1):32023. https://doi.org/10.1038/s41598-024-83694-9.
24. Masaadeh AH, Mathias PC, Ford BA, Bosch DE. Helicobacter pylori exposure in nausea and vomiting of pregnancy increases risk of preterm delivery. Infect Dis Obstet Gynecol. 2023;2023:6612268. https://doi.org/10.1155/2023/6612268.

CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	NSQ, MY
Acquisition, Analysis or Interpretation of Data:	NSQ, MY, AYM
Manuscript Writing & Approval:	NSQ, MY, AYM

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Copyright © 2025. Nizheen Shaban Qader, et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License, which permits unrestricted use, distribution & reproduction in any medium provided that original work is cited properly.