RESEARCH ARTICLE

HELICOBACTER PYLORI INFECTION IN ANEMIC PREGNANCY IN BAGHDAD, IRAQ.

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Manuscript Info	Abstract
	Background: Helicobacter pylori infection is one of the most common and endemic human infections worldwide, causing a number of very common and important gastrointestinal problems such as peptic ulcer, iron deficiency anemia and chronic gastritis. In general infecting almost half of the people in developed countries and 80% of people in developing countries. **Objective:** to identify the association between H. pylori infection and iron deficiency anemia in pregnant women. **Methods:** A cross-sectional study done at Obstetrics and Gynecology Department of three hospitals in Baghdad city, during the period from the first of January to 30th of September 2017. The study included 400 anemic pregnant women selected randomly and all subjects were analyzed in full details and hemoglobin estimation done during the 1st visit, and h.pylori test. **Result:** study sample divided into (51.8%) as a mild anemia, (33.8%) as a moderate anemia and severe anemia as 58(14.5%). The rate of a positive test among pregnant women who's had an infection by h. pyloriwere 63% which is higher than those women with the negative test as 37% with a significant association were found between h. pylori infection and iron deficiency anemia (p=0.001). Also The rate of positive h.pylori infected among pregnant women those were live in urban area was 37% which is higher than those living in rural 16% and the rate of pregnant women that have gastric discomfort more among those women with positive h.pylori infected were 35% but the women with negative h.pylori infected 30% .but without any significant association of residency and gastric discomfort with h.pylori infected. **Conclusion:**Helicobacter pylori (H. pylori) infection inpregnancy is more associated with iron deficiency anemia.

Introduction:-
Anemia is the commonest hematological disorder in pregnancy. By 'WHO', anemia is present once the hemoglobin (Hb) concentration within the peripheral blood is eleven gm/dl or less. The most common reason for anemia in maternity state is lack of iron. Less often, it's caused by vitamin B12 deficiency, the body wants to iron, cobalamin for biological process. If there's a scarcity of 1 or a lot of those ingredients or there's associate augmented loss of RBCs, anemia will be develop.[1]

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In some populations, 80% of pregnant women are anemic. Most of them are from low socio-economic teams and teenagers.[2]

Iron deficiency Anemia still epidemic levels among women and kids in several nations. In tropical countries, the incidence of anemia in physiological state is regarding 40-80%. In developed countries, it ranges between 10-20%. it's responsible for 2% of maternal death. In developing countries. Prevalence of anemia in South Asian countries is that the highest within the world, mirroring overall high rates of deficiency disease. It's unfortunate that the United Nations agency may be a major drawback in most of the South Asian countries.[3]

Many physiological changes occur in pregnancy that causes decrease within the level of hemoglobin. These changes embrace a rise in plasma volume by 50% whereas the red cell mass will increase by solely 33%; and consequently, there's a fall in hemoglobin concentration with reduction in each the hematocrit and red cell count due to hemodilution and reduce human iron and protein concentration afterward, the full iron-binding capability (TIBC) will increase.[4]

World Health Organization's (WHO) international Burden of malady Report identifies iron deficiency because of the twelfth most significant risk issue for all mortality globally, and also the ninth most significant risk issue for the worldwide burden of the malady.

Recent United Nations agency analysis of causes of maternal death shows that bleeding is that the major contributor to maternal deaths in developing countries.[5] Women with Iron deficiency anemia show a high risk of associated complications throughout pregnancy together with urinary tract infections, and pre-eclampsia.[5]

The study in the UK show that the increased in placental weight and a high quantitative relation of placental weight to birth weight, that are related to associate augmented risk of high pressure within the infants later life, are joined to maternal anemia throughout gestation and specifically to maternal iron deficiency anemia.[6]

Anemia throughout pregnancy conjointly could contribute to perinatal morbidity and mortality by increasing the chance of intrauterine growth retardation (IUGR) and preterm delivery. The most severe the anemia, the larger the chance that the mother can deliver a coffee weight baby because of IUGR. The association between birth outcomes and anemia is strongest in early physiological state suggesting that pre-pregnancy enhancements in iron standing are guaranteed.[7]

Anemia graduated into 3 degrees by United Nations agency, according to the hemoglobin level for every one of those forms of anemia in pregnancy as ,a mild at 10.0-10.9 g/dl ,moderate anemia at 7-9.9 g/d and severe anemia at < seven g/dl . Anemia In physiological state features a vital impact on the health of mothers and fetus furthermore as that increase of maternal death to 20% .[8]

Anemia in pregnancy classified into hereditary and acquired. 1t is determined by a specific formula for red blood cells in routine pregnancy tests, it is called Hemoglobin test which measurement of hemoglobin in the blood.

Tests to diagnose anemia:
Hemoglobin test: It is used to measure the amount of hemoglobin in red blood cells, and thus measures the ability of blood cells to transport oxygen from the lungs to the rest of the tissues.

Hematocrit test: which is used to measure the proportion of red blood cells in the drawn blood sample. If a woman is diagnosed with iron deficiency anemia or any other type, the doctor may require additional laboratory tests.

If the pregnant woman is not anemic at the beginning of pregnancy, it is certain that the doctor will ask for these tests again in the second or third trimester.[9]

Symptoms of anemia during pregnancy:
1. Pallor of skin, lips, nails, palms of hands, or underside of the eyelids.
2. Labored breathing.
3. Vertigo (sensation of spinning) or dizziness.
4. Fatigability (feeling tired).

5. Tachycardia (rapid heartbeat).
6. Trouble concentrating

Also the Symptoms of anemia deferent from woman to woman during pregnancy. But some women do not feel any thinks or may not be clear at first, and pregnancy symptoms may be similar to anemia symptoms. [10]

H. pylori in pregnancy
It is a common type of bacteria that attacks the lining of the stomach where it grows in the digestive system, affects approximately one half of the world population and it is more prevalent in developing countries.[11]

It can usually be harmless, sometimes infect stomach during childhood without any symptoms, but an adult can lead to disease and responsible for the majority of ulcers in the stomach and intestines.[12]

The spiral bacteria can be alive in the acidic environment of the stomach with penetrating the lining of the stomach through the body of the spiral.H. pylori pathogenicity depends on several strain-specific factors. Some H. pylori strain express specific genes conferring pro-inflammatory, cytotoxic and vacuolating properties which could enhance the in vivo pathogenicity.[13] Virulence factors such as urease and flagella are present in all strains and they are pivotal for pathogenesis and colonization.[14] Adhesins, such as Outer inflammatory protein and Sialic acid-binding adhesin, facilitate bacterial attachment to the host epithelium and often induce its inflammatory response.[15]

The methods of how the infection spread is not clear. Bacteria have coexisted with humans for several years. Infection is believed to pass from one person's mouth to another. It can also be transferred by fiasco-orally, but hand washing completely after using the bathroom can prevent infection or decrease of contamination.[16]

Sign and symptoms of H. pylori in pregnancy
Mild to moderate stomach upset is often related to nausea and emesis and complicates regarding 5% of all pregnancies, it diminishes women's life quality and social functions throughout early pregnancy.[17]

In most women, these symptoms resolve by fluid and nutrient supplementation in addition as a dietary modification. About 0.3%-2% of pregnant ladies suffer from hyperemesis (HG) characterized by severe and drawn-out emesis that usually ends up in dehydration, solution imbalance, ketonemia, ketonuria, and weight loss.[18] Dehydration and acid-base disturbances could cause external and internal organs injury. Patients United Nations agency manifest continuous weight loss and acid-base disturbances are lead to growth restriction, vertebrate anomalies and reduced infant birth weight.[19]

In addition, there was a lot of studies indicated a correlation between H. pylori infection and varied extragastric disorders, such manifestations include ischemic heart condition, DM, a blood disorder, urticaria, and sideropenic anemia. Lanciers et al (1999) found a considerably exaggerated incidence of pregnant subjects with high H. pylori IgM (a marker for recently noninheritable infection) compared to non-pregnant ladies.[20]

In general, pregnancy is characterized by a reduced cell-mediated cytotoxic response with preservation of humoral and innate immunity. Another necessary issue that has been self-addressed was the question of whether or not it's potential to transmit H. pylori infection from mother to kid and whether or not maternal anti-H.Pylori antibodies may stop infant's infection.[21]

Nowadays, no follow-up study was conducted to explain the whole response against H. pylori infection throughout pregnancy in Iraq. Most studies on the correlation between H. pylori infection and pregnancy-related disorders were H. pylori positivity was detected throughout pregnancy or before delivery. , wherever early pregnancy loss was related to maternal H. pylori CagA-strains seropositivity before intra-cytoplasmic spermatozoon injection. Indeed, it's uphill to undoubtedly conclude whether or not pregnancy-related complications area unit related to H. pylori infection noninheritable before or throughout pregnancy.[22]

Prevalence of H. pylori infection in pregnancy
The prevalence of H. pylori infection in pregnant ladies varies in keeping with geographical region, socioeconomic conditions and technique accustomed to observe H. pylori infection. For instance, the prevalence of H. pylori

infection among pregnant ladies is regarding 20%-30% in most European countries, Japan and Australia, whereasit's 50%-70% in Turkey[23-25]

The United Mexican States and in Texas, the UnitedStates,[26] over 80% in Egypt and Gambia. Inadequate sanitation practices, low class and crowded or high-density living conditions appear to be associated with the next prevalence of H. pylori infection. These observations recommend that poor hygiene and overcrowded conditions could facilitate transmission of infection among relations and that the area unit per information on an intra-familial and institutional bunch of H. pylori.[27]

H.Pylori and iron deficiency anemia
Recent proof suggests that H.Pylori is related to iron deficiency anemia. Many cross-sectional studies have found in nursing there is an association between H.Pylori and low body iron stores and iron deficiency anemia and a reduced response to iron supplementation. Weyermann et al found that pregnant ladies infected with H.Pylori had lower mean hemoglobin (Hb) level at the start of physiological state and a larger decrease within the mean hemoglobin level at the end of pregnancy.[28]

In Kenya, anemic youngsters had a pair of.5-fold a higher proportion of elevated IgM protein titers against H.Pylori than non-anemic youngsters.[28]

Iron deficiency, outlined as slashed total body iron content, is among the most common nutritional deficiencies within the world. Iron deficiency ends up in impairments in immune, cognitive, and generative functions, in addition as slashed work performance. Iron deficiency develops through 3 stages: 1) iron depletion, 2) iron-deficient organic process, and 3) iron-deficiency anemia (IDA).though the mechanisms stay unclear, clinical and epidemiological studies suggest that infection with H.Pylori is related to iron deficiency and IDA.[27]

Mechanism of iron metabolism and contributive molecules are necessary for understanding the impact of H. pylori infection on IDA. Body iron metabolism may be a semi-closed system and is critically regulated by many factors. The total quantity of body iron is roughly 3–4 g. 2 thirds of iron is found within the pool of red blood corpuscle (RBC) and recycled by blood cell destruction; the rest is kept solely 1–2 mg of iron is absorbed from gastrointestinal tract and circulated within the blood. Since, there's no active mechanism to pass iron from the body, iron balance is controlled by absorption [1].

Nearly all absorption of dietary iron happens within the small intestine. Steps concerned in iron metabolism include the reduction of iron into a mental state ($Fe2+$), top uptake, intracellular storage or transcellular trafficking, and basolateral unleash. Many proteins play a role in these steps.

H. pylori might act in dynamic molecular mechanisms that play a task in iron metabolism, the best-evaluated molecule within the association between H. pylori and ID is hepcidin, it is a supermoleculethatis secreted into the blood and interacts with villous enterocytes to manage the rate of iron absorption by dominating the expression of ferroportin-1. Once hepcidin is increased, iron unleashes from enterocytes is reduced.

The anemia of chronic inflammation is mediated, in part, by the stimulation of hepcidin by cytokines. Hepcidin has been according to be elevated in patients infected with H. pylori, acting as AN acute-phase chemical in response to the inflammation created within the internal organ tissue layer and leading to a pathology referred to as "anemia of inflammation or chronic disease".[14]

H. pylori infections diagnoses:[29]
Physical examination:
throughout a physical exam, abdominal examination for signs of bloating, tenderness, or pain. They'll additionally listen for any sounds inside the abdomen.

Blood check:
have to be compelled to offer blood samples, which is able to be an accustomed search for antibodies against H. pylori. For a biopsy, an attention supplier can draw a little quantity of blood . The blood can then be sent to a laboratory for analysis. This can be solely useful if you have been ne'er been treated for H. pylori before.

Stool test:
A stool sample is also required to examine for signs of H. pylori ., they'll send the sample to a laboratory for analysis. This and also the breath checks sometimes would force you to prevent medications like antibiotics and nucleon pump inhibitors (PPIs) before the test.

Breath check:
If you have got a breath test, you'll swallow a preparation containing the organic compound. If H. pylori microorganism area unit gift, they'll unleash associate catalyst that breaks down this mixture and can unleash carbonic acid gas, that a special device then detects.

Endoscopy:
a doctor can insert a protracted, skinny instrument known as an associate medical instrument into your mouth and down into your abdomen and small intestine. associate hooked up camera can remit pictures on a monitor for your doctor to look at. Any abnormal areas are inspected. If necessary, special tools used with the medical instrument can permit your doctor to require samples from these areas.

Complications of H. pylori infections in maternity
Miscarriage :
H.Pylori infection increased the risk of miscarriage to 15% of   pregnancies

Neural tube defects:
many studies reported that serum/plasma vitamin B12 and folate levels are lower in subjects with H. pylori infection compared to uninfected persons .[30]

Thrombocytopenia:
Association between H. pylori and blood disorder has been incontestable in an exceedingly non-pregnant population. The etiology of blood disorder is also thanks to cross-molecular mimicry between specific H. pylori macromolecule (CagA) and protoplasm antigens, but no relationship was found between H. pylori infection and protoplasm count throughout pregnancy.[31]

peptic ulcers:
H. pylori infections will result in biological process ulcers, however the infection or the ulceration itself will result in additional serious complications. These include: internal hemorrhage, iron deficiency anemia ,obstruction, perforation, redness.[2]

Treatment of H. pylori infections
There are multiple choices for H. pylori infection treatment. The association of a proton-pump inhibitor and two antibiotics for 1 or 2 wk gives the best eradication rates in non-pregnant subjects. Currently, there are no guidelines to treat H. pylori infection during pregnancy and the optimal therapy in pregnancy remains uncertain.[32]

Several investigators have evaluated the safety of individual drugs, including proton pump inhibitors used in the anti-H. pylori drug therapy in pregnant women. A recent meta-analysis reported that the use of proton pump inhibitors during first-trimester does not seem to be associated with an increased risk of spontaneous abortion, preterm delivery or major congenital birth defects.[27]

Nevertheless, some experts recommend that H. pylori eradication should be deferred until after pregnancy and lactation. It must be considered that treatment of H. pylori infection has a low success rate, with 35%-85% of infections being cleared, reaching the lowest values in some European countries.[33]

Methodology:-
Study design:
A cross-sectional study

Study setting:
The study was conducted in Baghdad Governorate which is the capital of the Republic of Iraq, with a total area of 204.2 square kilometers. The city is located in the heart of Iraq on a vast plain bisected by the River Tigris into two halves; with the eastern half being called 'Risafa' and the Western half is known as 'Karkh' (Appendix 1).

Al-Karkh health directorate in (Al-kara side of Baghdad) had seven hospitals distributed according to the geographical location and population divisions in the region. Each hospital has a department of obstetrics and gynecology. The study was conducted at three hospitals were selected using a systematic random sampling technique, which was in the Ankara side of Baghdad city; but, all over the country .

Time Data Collection:-
The study was carried out during the period from first of January   to the 30th of September 2017

Study population:
pregnant women within selected criteria

inclusion criteria:
1.   Pregnant women Aged 18 -40 years .
2.   Pregnant women with anemia who had been referred to the Clinic of Gynecology and Obstetrics of Hospital.
3.   All gestational ages were determined by the first day of the last menstrual period and confirmed with an ultrasound

Exclusion Criteria:
Pregnant women with a chromosomal or anatomic abnormality,known cardiac disease, renal dysfunction, confirmed peptic ulcer, SLE, kidney stones, rheumatoid arthritis , previous thromboembolism, known malignancy, malabsorption syndrome , sensitivity to aspirin, hypertension or current treatment with antihypertensive drugs, previous prednisone therapy.

Sampling Design
Sampling method:
A sample frame of all hospitals in Baghdad Al Kerkh director of health. Inaccessible the hospitals that not contain obstetric department were excluded. Seven hospitals that were included in the list. Three hospitals were selected using a simple random sampling technique. The total sample size was distributed equally among these hospitals. The researcher visited this hospital 5 times a week, 4 hours per day.

Sample size:
For estimation of the sample size a confidence interval of 95% was used
Following equation: $N=Z^2 *P (1-P) /d^2.$
N = required sample size
Z = confidence level of 95% (standard value of 1.96)
P = estimated prevalence
d=precision estimated to be (0.05)
According to available sources from the Ministry of Health in Iraq, the prevalence of anemia in pregnant women was 40% in the year 2016. After the application of the above equation the sample size needed is 368, and we engage 400 pregnant women to increase the validity of the study and to compensate any non-response of the pregnant

Data collection:
A structured questionnaire is developed to collect information from the participation. The subtending was conducted by the researcher. Some information regarding maternal factors and certain other information was obtained from the records, while other information was obtained from the pregnant women.

Data Collection Tool
Questionnaire:
A structured questionnaire is the base for data collection developed by the researcher and reviewed by the supervisor and it is consisting of;

The demographic information includes: code NO., age, birthday, weight, height and BMI, number of people living in the room, crowding index (≤3 people/room: not crowded, > 3 people/room: crowded), Parity was considered as the number of gestation resulting in live birth or stillbirth.

Maternal characteristics such as education were coded as not education, and ,or primary or secondary education and high education.[2] mother occupation, maternal smoking during pregnancy, history of diabetes mellitus (DM)/hypertension, Mother's age during delivery, history of abortion and the presence of gestational diabetes mellitus were obtained from the pregnancy chart . Maternal age was categorized into three groups such as, <18, 18–34 and≥34 years.

Serological and Biochemical tests.
A-Serological testsH. pylori infection has been diagnosed by using ELIZA test was used to detect Anti- H. pylori IgG, antibodies.

A- Complete blood count (CBC) test was done for all samples to indicate anemia.

Anthropometric measurements:
Weight: measured using an adult portable beam scale with 150 kg capacity with the patients wearing the lightest possible clothes results were taken to the nearest 0.1 kg.

Height: was determined with the individual barefoot and in an orthostatic position with the aid of a portable stadiometer consisting of a non-extendable 2-meter measuring tape divided into 0.1cm increments.

Body weight and height were measured twice for every participant and the average of the readings was considered as the participant's weight and height respectively. Each participant's BMI was calculated using the following formula: BMI = pre-pregnancy body weight (kg) divided by height (m) squared. The BMI was categorized using the World Health Organization criteria as follows; underweight (< 18.5 kg/m2), normal weight (18.5-24.9 kg/m2), overweight (25.0-29.9 kg/m2), obese (≥ 30.0 kg/m2) [27].

Statistical Analysis:-
Data was translated into a computerized database structure. Statistical analyses were done using SPSS (Statistical Package for Social Sciences). Version 20 computer software for windows. Categorical variables were presented as frequency and percentage , Chi-square was used to test the significance of the association between categorical variables .with considered P. Value of ≤ 0.05 was statistically significant.

Ethical consideration:
Agreement of MOH-Iraq, and Baghdad Al Karkh directorate of health.
The collection of data was kept confidential and not be divulged except for the purpose of the study.
The Participant's agreement will be considered and they will be informed that participation is voluntary and they can withdraw from the study after having agreed to participate.

Results:-
 A total of 400 more than 18 years pregnant women were included in this study, taken from three hospitals in Baghdad. The total sample was selected as pregnant women with anemia and classified according tothe severity of anemia. The degree of anemiagraduated from mild, moderate to severe, the WHO pegsthe hemoglobin level for each of these types of anemia inpregnancy at 10.0-10.9 g/dl (mild anemia), 7-9.9 g/dl(moderate anemia) and < 7 g/dl (severe anemia) as shown in figure (1).

 Out of 400 pregnant female of the study sample were suffering from mild anemia as 207 (51.8%) and 135(33.8%) were moderate anemia, but the lowest prevalence was pregnant women with severe anemia as 58(14.5%). table 1
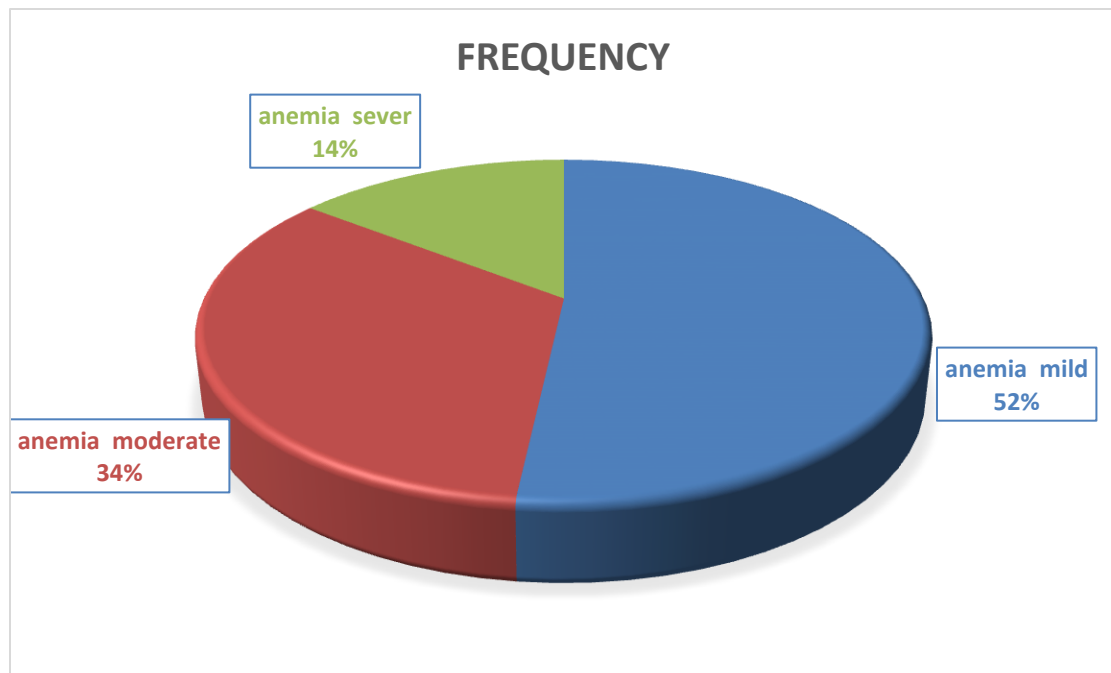
Figure 1:-Distribution of the study sample according to the degree of anemia

Table 1:-distribution of the study sample according to the degree of anemia n=400

	Frequency		Percent	
anemia	**mild**	**207**	**51.8**	
	moderate	**135**	**33.8**	
	sever	**58**	**14.5**	
	Total	**400**	**100.0**	

Socio-demographic characteristics of the studied sample:
The age of sample study was divided into three categories,the most prevalent age of pregnant women was 33-40 years 149 (37%), the second group was 25-32 years (36%) and the last group was 18-24 years 108(27%). Distribution of study sample according to age and degree of anemia was more in age 33-40 years and increase with age in all degree of anemia but without any significant association between age and anemia.

Regarding to education level of pregnant women were mostly illiterate and secondary education level as (38.5% & 22.2% respectively).while the relationship between the severity of anemia and level of education the result founded decrease degree of anemia in pregnant women with an increased level of education and with a significant association p=<0.001. table 2

The current study showsthe highest prevalence of study sample was nonsmoking women as 99% and 1% smoking women in pregnancy without any significant association with degree of anemia.

Regarding occupation of pregnant women were mostly non worker (61%) while the employed pregnant women were (39%),and the highest prevalence of anemic pregnant women was suffering from mild anemia 33% without any significant association with the occupation.   Table 2

Table 3.1:-Distribution of the sample according to socio-demographic characteristics and severity of anemia.

	anemia			Total	
	mild	moderate	sever		
Age	18-24 years	60	34	14	108

	25-32 years	71	47	25	143
	33-40 years	76	54	19	149
$\chi 2$ =2.279 DF=2 P=0.655					

	anemia	Total			
	mild	moderate	sever		
Pregnant Education level	illiterate	78	57	19	154
	primary	28	30	19	77
	secondary	52	25	13	90
	university	49	23	7	79
$\chi 2$ =49.695 DF=2 P=< 0.001					

	anemia	Total			
	mild	moderate	sever		
Smoker women	non smoke	206	135	57	398
	smoke	1	0	1	2
$\chi 2$ =2.247 DF=2 P=0.208					

	anemia	Total			
	mild	moderate	sever		
Employed women	no	135	73	36	244
	yes	72	62	22	156
$\chi 2$ =4.289 DF=2 P=0.117					

Obstetrical history of the study sample:
The highest proportion of pregnant women of the studied had normal weight during the pregnancy as (77.5%) ,while (21.5%) were underweight with a significant association between severity of anemia and BMI of pregnant women where decrease weight pregnant with increased severity of anemia p=<0.001. also Most of the women in the study sample had no complication during their pregnancy as (95%) for the history of diabetes while the highest proportion of pregnancy complications with hypertension was 91% and without any significant association severity of anemia, as shown in the table (2).

The current study showed most prevalences of the study sample were not have history of abortion with 48% of pregnant women suffering from mild anemia and without relationship between anemia and abortion .while the pregnant women prim gravida were very high in comparison with pregnant women with multigravida as (71% and 29% respectively), there was significant association with the severity of anemia p= 0.003

Regarding the marital status of the study shown the highest proportion of pregnant were married as 89% and a very low proportion of divorce female among sample study as 11%, but without association with anemia p= 0.416.(table 3)

Also the result showed the pregnant women with a history of anemia were more than those don't have a history of anemia as (74% and 26% respectively), there is a significantassociation   with anemia during the pregnancy p=<0.001. (table 3)

Table 3:-Distribution of the sample according to obstetrics characteristics and degree of anemia during pregnancy. n=400

	anemia	Total			
	mild	moderate	sever		
Weight during pregnancy	underweight	21	29	36	86
	normal	183	106	22	311
	overweight	3	0	0	3
$\chi 2$ =47.473 DF=2					

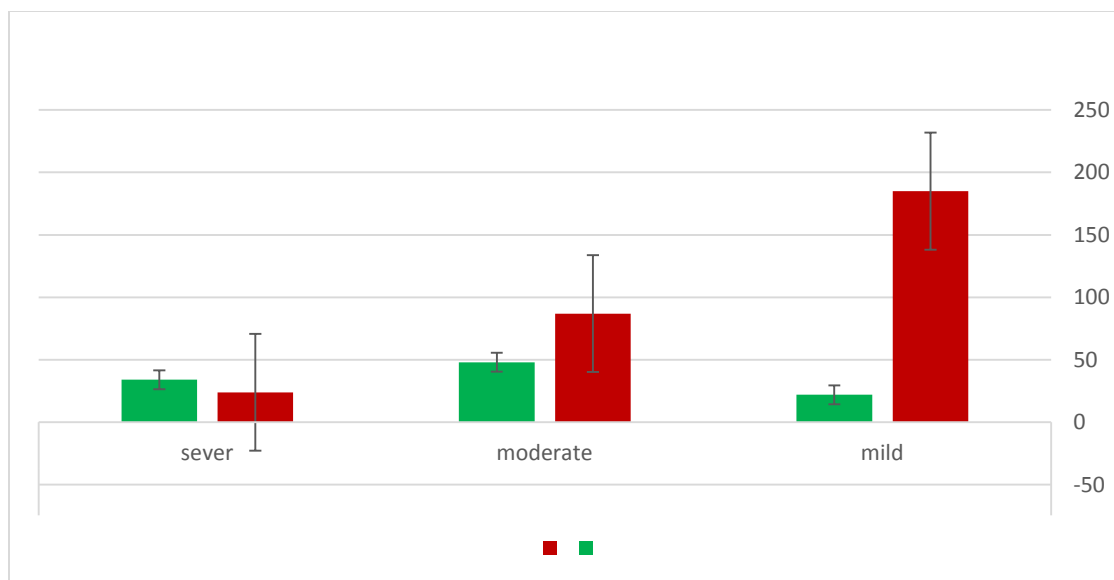| P=0.001					
	anemia	Total			
	mild	moderate	sever		
History of DM	no	201	125	54	380
	yes	6	10	4	20
χ2 =4.011 DF=2 P=0.135					
	anemia	Total			
	mild	moderate	sever		
History of HT	no	189	124	53	366
	yes	18	11	5	34
χ2 =3.33 DF=2 P=0.984					
	anemia	Total			
	mild	moderate	sever		
history of anemia	yes	185	87	24	296
	no	22	48	34	104
χ2 =63.66 DF=2 P=0.001					
	anemia	Total			
	mild	moderate	sever		
Previous Abortion	no	194	116	50	360
	yes	13	19	8	40
χ2 =6.599 DF=2 P=0.37					
	anemia	Total			
	mild	moderate	sever		
Parity	prim gravida	161	82	41	284
	multigravida	46	53	17	116
χ2 =11.52 DF=2 P=0.03					
	anemia	Total			
	mild	moderate	sever		
marital status	married	188	117	53	358
	divorce	19	18	5	42
χ2 =1.756 DF=2 P=0.116					

Figure 2:-Distribution of the study sample according to the degree of anemia and history of anemia.
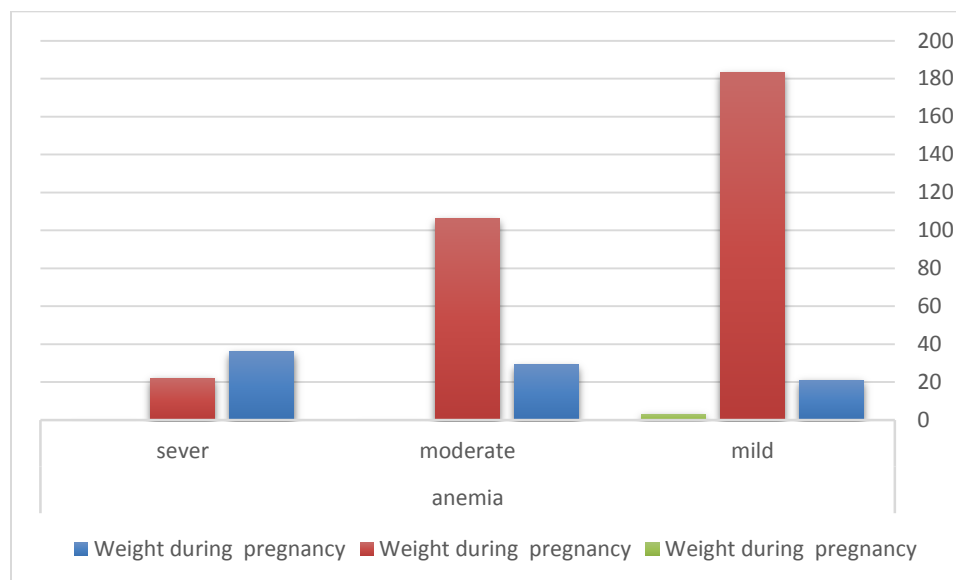

Figure 3:-Distribution of the study sample according to the degree of anemia and weight during pregnancy.

Table (4) shows the distribution of the studied sample by Residency and crowding index (no.of person / room), The rate of pregnant women among crowding index less than three were more than those in less than three (55% and 45% respectively), the relationship between anemia and crowding index was inversely and without any significant association.

Also the study showed the pregnant women's that living in the rural area was 30.5 % which is lower than those living in an urbanarea at 69.5% . but there is significant association was found between degree of anemia and residency. Table 4

Table 4:-Distribution of the studied sample by crowding index &residency with anemia

		anemia	Total		
		mild	moderate	sever	
Crowding index (Number per room)	More than 3	87	66	26	179
	Less than 3	120	69	32	221

χ2 =1.133 DF=2 P=0.459		anemia	Total			
		mild	moderate	sever		
residency	rural	54	63	5	122	
	urban	153	72	53	278	
χ2 =31.645 DF=2 P=<0.001						

The current study showed the distribution of the studied sample by h. pylori test. The rate of a positive test among pregnant women who's had an infection by h.pylori was 63% which is higher than those women with the negative test as 37%. As shown in table 5

The rate of cases with positive h. pylori infection increase among pregnant women with severe anemia than those mothers with another negative test. and there are significant associations were found between h. pylori infection and severity of anemia. Table 5
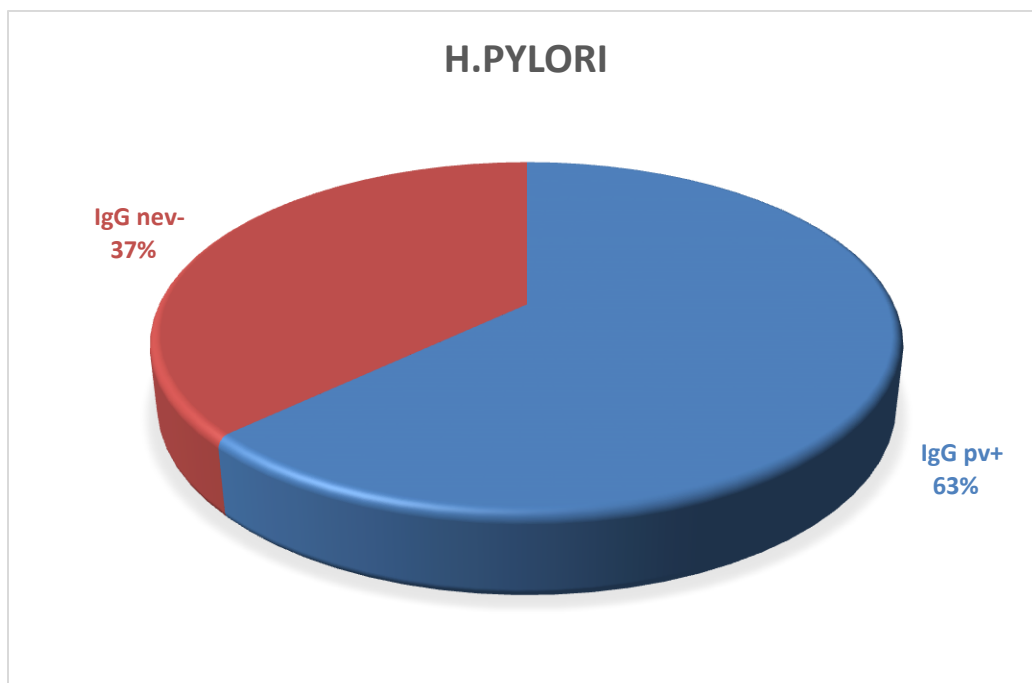

Figure 4:-Distribution of the study sample according to the frequency of H.pylori

Table 5:-Distribution of the studied sample according to H.Pylori test and anemia. N=400

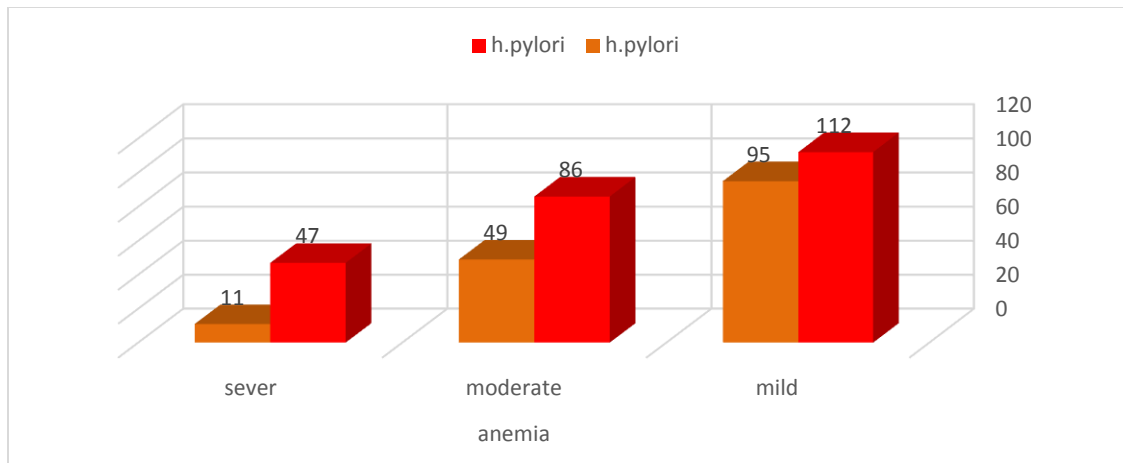|		anemia	Total			
		mild	moderate	sever		
h.pylori	IgG positive +	Count	112	86	47	245
		% of Total	28%	21.5%	11.5%	61%
	IgG negative-	Count	95	49	11	155
		% of Total	24%	12.2%	2.8%	39%
χ2 =14.395 DF=2 P=<0.001						

Figure 4:-Distribution of the study sample according to the degree of anemia and h.pylori infected.

Table (6) shows the distribution of the studied sample by residency and h.pylori infection. The rate of positive h.pylori infected among pregnant women those was live in an urban area was 37% which is higher than those living in rural 16% without any significant association residency and h.pylori infected.

Also the rate of pregnant women that have gastric discomfort more among those women with positive h. pylori infected were 35% but the women with negative h. pylori infected 30%. No significant associations were found between gastric discomfort and h.pylori infected.

Table 5:-Distribution of the studied sample according to H.Pylori test with residency and gastric discomfort. N=400

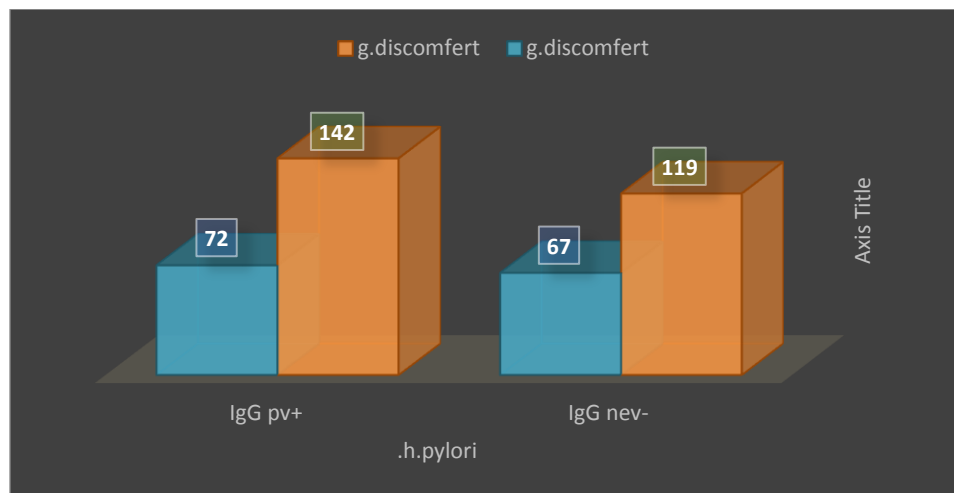|		residency	Total	
		rural	urban	
h.pylori	IgG nev-	57	129	186
	IgG pv+	65	149	214
χ2 =0.033 DF=2 P=0.953				
		g.discomfert	Total	
		yes	no	
h.pylori	IgG nev-	119	67	186
	IgG pv+	142	72	214
χ2 =0.228 DF=2 P=0.619				

Figure 5:-Distribution of the study sample according to gastric discomfort andh. pylori infected

The current study showed the most prevalent age of pregnant women that have positive h.pylori was 33-40 years 98, and increase no. of cases with an increasein age but without significant association (p=0.359).

Regarding education level of pregnant women were mostly illiterate level as 96 had positive infection .while the relationship between the h.pylori and level of education the result founded a decrease in pregnant women with an increased level of education and without any a significant association p=<0.655. table 6

 The current study showsthe highest prevalence of study sample was nonsmoking women as 99% and 1% smoking women in pregnancy without any significant association with h. pylori.

Regarding occupation of pregnant women were mostly nonworker have a positive infection without any significant association between h.pylori and occupation (p=0.592).

Also the result founded no any significant association between h.pylori infection in pregnant women and previous history of abortion and parity as shown in table 6.

Table 6:-Distribution of the studied sample according to H.Pylori test with the sociodemographic characteristic   . N=400

		h.pylori	Total	
		IgG pv+	IgG nev-	
Age	18-24 years	63	45	108
	25-32 years	84	59	143
	33-40 years	98	51	149
χ2 =2.050 DF=2 P=0.359				
		h.pylori	Total	
		IgG pv+	IgG nev-	
Mother Education	illiterate	96	58	154
	primary	44	33	77
	secandry	64	26	90
	university	41	38	79
χ2 =2.771 DF=3 P=0.655				
		h.pylori	Total	
		IgG pv+	IgG nev-	
Smoker mother	nosmoker	244	154	398
	smoke	1	1	2
F*=0.107 DF=1 P=0.743				
		h.pylori	Total	
		IgG pv+	IgG nev-	
Employed mother	no	152	92	244
	yes	93	63	156
χ2 =0.288 DF=1 P=0.592				
		h.pylori	Total	
		IgG pv+	IgG nev-	
Previous Abortion	no	220	140	360
	yes	25	15	40
χ2 =0.029 DF=2 P=0.864				
		h.pylori	Total	
		IgG pv+	IgG nev-	
Parity	primigravida	168	116	284
	multigravida	77	39	116
χ2 =1.811 DF=1 P=0.178				

Discussion:-

Iron deficiency is that the most typical nutrition deficiency within the world and leads to impairment of immune, psychological feature and reproductive functions, additionally as reduced work performance [34]. Iron deficiency anemia (IDA) affects over a billion individuals worldwide and contributes to up to forty percent of maternal deaths within the developing countries [35]. During a typical singleton pregnancy, the common daily demand for iron is close to 4.4 mg. A supplementation is required once diet alone cannot provide this quantity of iron, however despite iron supplementation, many ladies still stay anemic.

According to study in 2013 by The American Society of Tropical Medicine and Hygiene 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[36].

In the current study, the incidence of seropositivity for H. pylori among pregnant womenwith IDA was 61% which is similar to study conducted in Tehran, Iran 2007.[37] which showed that positive cases with H. pylori with IDA was 52% and other studies including a meta‑analysis of 12 case reports and case series, 19 observational epidemiologic studies an increased risk for IDA among H. pylori‑positive cases.[36]Another study conducted in Iraq. Which included168 pregnant women in the first trimester showedthat the risk of IDA among pregnant women in whichH. pylori infection was 3.18 times more compared to thosewho were not infected.[38]

On the other hand, a study done by Saler et al. found that there was no association between H. pylori‑positive cases and IDA with normal gastrointestinal tract endoscopy results.[39]

Different mechanisms have been hypothesized for the development of IDA in H. pylori infection some of which suggested that H. pylori strains require iron for their growth and proliferation and some H. pylori strains have a specific ability to interfere with iron metabolism by binding iron to their outer membrane proteins; and, some of which are decreased mucosal iron absorption capacity due to low gastric pH, reduction of stomach vitamin C levels. another mechanism is that H. pylori require iron as a growth factor, and it possesses a 19‑kDa iron‑binding protein resembling ferritin, that may play a role in the storage of excessive iron by the bacteria.[40]

 In a cross-sectional study, conducted in Departments of Obstetrics and Gynecology, Baskent University, Antalya , out of 117 pregnant women, 27 had anemia and all of the anemic patients were shown to be H. pylori-infected, and with a high chance of fetal growth restriction. [41]

Mild to moderate(dyspepsia, nausea and vomiting) is commonly associated with 50%of all pregnancies and it diminishes women's life qualityand social functions during early pregnancy [42]. In most women, these symptoms resolve by fluid and vitaminsupplementation as well as dietary modification. About0.3%-2% of pregnant women suffer severe and protractedvomiting that often results in dehydration, electrolyte imbalance, ketonuria, and weight loss.[43,44]

The etiology of gastrointestinal symptoms is always may be to multifactorial may be psychological causes, gastrointestinal tract dysfunctions, endocrine factors, immunologicalfactors and nutritional deficiencies have beenconsidered part of the pathologic mechanism underlying gastrointestinal symptoms [45]. The result of current study founded the pregnant women with positive H.pylori infected more have gastrointestinal symptoms than those have negative infected but without statically significant , this result disagreement with a Significant positive association between gastrointestinal symptoms and H.pylori infection has been demonstrated by several case-controlstudies [46].

 in a systematic review of 14case-control studies, Golberg et al [47] (2007) found a higherprevalence of nausea and vomiting in H. pylori-infected pregnant womenthan uninfected ones [48].Shirin andcolleagues (2004) reported an association between H.pylori and mild vomiting during early pregnancy but notwith gastrointestinal symptoms later in pregnancy [49].In contrast, several studies found no relationship between gastrointestinal symptoms and H. pylori[50,51,52].

Our study has several limitations. First, we cannot confirm the actual causality between H. pylori infection andanemia as this is an observational study. Second, all subjects were from the health examination population at

2 Hospital in Baghdad, which leads to selection bias. The third limitation is that serological testingfor the presence of anti-H. pylori IgG does not indicate a current infection and only shows exposure tothese bacteria, which may have biased the detection of H. pylori infection.

Conclusion:-

The level of H. pylori seropositive antibodies was found to be higher among pregnant patients with severe IDA compared to pregnant patients with mild Hb level suggesting an association between H. pylori infection and IDA in pregnancy. Further research is needed to determine the potential role of H. pylori bacterial load in anemic pregnancy . Because of the high worldwide prevalence of this infection.

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