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RELATIONSHIP BETWEEN ANEMIA IN PREGNANT WOMEN AND SOME SOCIAL PARAMETERS IN BAGHDAD

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ABSTRACT
The study was carried out four months in the province of Baghdad including many hospitals in Bagdad during 1st of the November 2016 until 28 February 2017. 120 pregnant women included in the present study ranged in age from 14-42 years were randomly selected. Pregnant women were divided into three groups according to the different periods of pregnancy every trimester include 40 pregnant women divided to 20 pregnant women with anemia and 20 without anemia after taking a blood film and hemoglobin as a good indicator for diagnosis of anemia, also, history taken by previously diagnosis and by physical examination. The results of the study the association between anemia in the pregnant and some social factors, such as: maternal age, age at marriage, age at first pregnancy, the maternal gravidity, parity of residence, abortion and place fetal loss. On the other hand occupation, monthly income and maternal education.

KEYWORDS: hospitals, pregnant women, anemia, social factors, education.

INTRODUCTION
The pregnancy is the most important physiological cases accompanied by many changes in the body due to the many hormones effort, which is mainly by high levels of hormones progesterone and estrogen and placental lactogen addition to other hormones (Al-Araji, 2002). The WHO criterion for anemia in women is Hb less than 120 gm/L and less than 110 gm/L in pregnant women due to physiological anemia (Maida and Baybeen, 2007). Anemia in pregnancy is an important public health problem worldwide; the prevalence may be as high as 35-75% (56 on average) in developing countries. However, in developed countries reached to 30% (WHO, 2002). Also, in Iraq many research study the anemia during pregnancy of women and they showed that the reason of that may be the age of pregnant ,academic level and level of living (Muthana *et al*., 2005 ; Salwa, 2009 ; Abdul Rahman, 2010 ; Abdul Razzak *et al*. ,2012; Luay, 2012 ; Najlaa and Iqbal, 2013 ; Abeer *et al*., 2013; Fatima 2013; Mohammed *et al*., 2015 and Awaz *et al*., 2015). In the present study, we identified risk factors associated with severe anemia among a large sample of pregnant women living in the rural and urban in many hospital of Baghdad. The aim of our present study was to determination relationship between anemia and socio-demographic characteristics. To determine identify factors associated with the anemia (maternal age, maternal education, gestational age, parity, gravidity, occupation monthly income and dietary habits).

MATERIALS & METHODS
Collection of information
In present study have been getting information from pregnant women in hospitals and health centers diffuse in

the province of Baghdad, including Baghdad teaching hospital, Al-Alwaya hospital , Al-Karama hospital, Fatima Al-Zahra hospital, Al-Karkh hospital, Al-Kadhimiya hospital, and a health center in Al- Dorra and Al-Shaab. During the period from the 1st of the November, 2016 until 28 February 2017. included Special questionnaire for each pregnant women the: full name of the women, age, region, education, current period of pregnancy , the number of abortions, gravidity, parity , and the type of work, occupation, income monthly and it is suffering from diseases or not. It has been excluded from this study are : Pregnant women with diabetes, chronic hematological diseases. And pregnant women infected with the pressure, cardiac or liver diseases. The study included 120 pregnant women from Baghdad province, ranged in age from (14-42 years) were randomly selected for this study. Pregnant women were divided into three groups according to the different periods of pregnancy, As follows: The first trimester of pregnancy included were 40 pregnant women, (20 pregnant women with anemia and 20 pregnant women without anemia). The second trimester of pregnancy included were 40 pregnant women, (20 pregnant women with anemia and 20 pregnant women without anemia). The third of pregnancy included were 40 pregnant women, (20 pregnant women with anemia and 20 pregnant women without anemia). In this study, the adoption of hemoglobin and study of peripheral smear is good indicator for diagnosis of anemia. After determine of Hb to know the pregnant with anemia or without. If the pregnant Hb under 10g/dL is anemic women.

Statistical analysis
Analysis of the results statistically ensure the use of the calculate the percentage (%) from the data.

RESULTS & DISCUSSION
Comparison between Different Trimesters of Pregnancy
By contrast analysis (ANOVA) and to find the least significant difference (LSD) between different pregnancy periods Table (4.1) we note significant differences in blood parameters among pregnant women in different gestational periods. In the mean of hemoglobin, there was no significant difference between the first, second and third trimester of pregnancy (11.62±0.262) (11.23±0.259) and (11.02 ±0.289) g/dL respectively. And in percentage of Hct there was a significant difference between the first, second and third trimester pregnancy (39.24 ±0.717) (36.05 ±0.699) and (32.95 ±0.658)% respectively. While in MCV there was highly significant difference (p< 0.01) between the 1st, 2nd and 3rd trimester of pregnancy (87.39 ±0.779) (84.25 ±0.867) and (81.07 ±1.015)fL respectively.

TABLE 1: Comparison in blood parameters between 1st , 2nd and 3rd trimester of pregnancy.

Parameter	1st trimester n=40	2nd trimester n=40	3rd trimester n=40	LSD
Hb (g/dL)	11.62±0.262 NS	11.23±0.259 NS	11.02±0.289 NS	0.757 1.001
Hct (%)	39.24±0.717**a	36.05±0.699**b	32.95±0.658**c	1.938 2.561
MCV (fL)	87.39±0.779**a	84.25±0.867**b	81.07±1.015**c	2.383 3.149
MCH (pg)	29.72±0.463 a	28.19±0.540*b	27.05±0.567**b	1.470 1.943
MCHC (g/dL)	34.05±0.267 a	32.99±0.310*b	33.08±0.362*b	0.883 1.167

Values are expressed as means ± Standard devision (SD)
a ,b, c Mean within the same row with different superscripts Significantly differ (p< 0.05) and (p< 0.01).
**Significant (p< 0.01), * Significant (p< 0.05) .

From Table (2) showed significant difference in iron indicator of pregnant women in difference trimester of pregnancy, there was significant difference (p<0.01) between first trimester (16.68 ±2.514) µmol/L and second trimester (10.66 ±0.783) µmol/L but there was no significant in third trimester (10.01 ±2.174) µmol/L in serum iron.
On the other hand, in total iron binding capacity (TIBC), there was no significance between the average of first trimester (116.99 ±5.434) and second trimester (111.25 ±3.278). Also there was significant (p< 0.01) between second trimester (111.25 ±3.278) and third trimester (131.87 ±3.036). And in percentage of transferrin saturation (TS%) there was a significant between 1st, 2nd and 3rd trimester (14.45 ±1.199) (9.39 ±1.073) and (7.51 ±0.770) respectively. Also, in average of serum ferritin (SF) there was no significant between 1st, 2nd and 3rd trimester (15.16 ±1.816) (13.87 ±1.871) and (12.87 ±1.816) respectively.
Through the results of the analysis of variance concluded in this study between different periods of pregnancy, we showed significant differences in blood parameters between the three periods of pregnancy. ACOG (2008) showed this back to happen of anemia in these different periods, centers for disease control and preventation have known anemia with concentration of hemoglobin (less than 11g/dL at a rate of Hct 33%), (less than 10.5 g/dL at a rate of Hct less than 32%) through first third, second third and third from pregnancy respectively.

TABLE 2: Comparison between indicators of iron (SI, TIBC, TS and SF) in different pregnancy periods in all women

Parameter	1st trimester N=40	2nd trimester N=40	3rd trimester N=40	LSD
SI (µmol/L)	16.68±2.514**a	10.66±0.783**b	10.01±2.174**b	3.112 4.113
TIBC (µmol/L)	116.99±5.434**b	111.25±3.278**b	131.87±3.036**a	11.379 15.032
TS (%)	14.45±1.199**a	9.39±1.073**b	7.51±0.77**b	3.148 4.160
SF (ng/mL)	15.16±1.816	13.87±1.871	12.87±1.816	7.436 9.828

Values are expressed as means ±Standard devision (SD)
a ,b, c Mean within the same row with different superscripts Significantly differ (p< 0.05) and (p< 0.01).
**Significant (p< 0.01) * Significant (p< 0.05)

There has been a high prevalence of anemia in developing countries; exactly iron deficiency anemia during pregnancy is very common and preventable problem. It remains a major contributing factor to maternal morbidity and mortality (WHO, 2001). A study by Abeer *et al.,* (2013) showed that the most frequent age group of pregnant women (20-29 years) has the highes propotion (39.2%) with anemia, this result in Ibn-Albalady hospital in Baghdad is lower than that found by Lama in Jordan (Aluka *et al.,* 2001) 43% were in age group 20-30 and by

(Hanmanta, 2011) in Solapur (Fatemeh *et al.,* 2010) 86.9% of cases were in the age group of 20-29 years , this may be due to differences in nutritional habits in developing countries. A study of anemia in India (Lone *et al.,* 2004) has reported moderate anemia in 61% of the cases. This higher result may be related to different dietary habits among countries, which indicates that there are differences in the habits and the living level between the countries, this agrees with the results in the present study.

Explained the status of anemia in mothers was depend on the extremes of mother's age, age of marriage and age of first gestation

Pregnant women with anemia and non-infected women were classified according to age to three age groups Table (4.3) and the results showed that the highest percentage for anemia patients registered for pregnant women in age groups (20-29) it reach 38.3% followed by age groups 30

and it reach 33.3% and age groups < 20 it reach 28.3% . On the other hand in women without anemia in age groups (20-29) years was reached at higher percentage 50% followed by age group 30 and > it reach 38.3% while the lowest percentage was for members of the age group < 20 also it reach 11.7%. That is agreement with Muna (2013) showed that of the highest percentage 62.4% pregnant women with anemia in age group 20-29 years. However, Abeer *et al.* (2013) in Baghdad showed 39.2% of cases with anemia were in age group of 20-29 years, this result is lower than that found by Aluka *et al.* (2001) in Jordan 43% were in age group 20-30 years and by Fatemeh *et al.,* (2010) in Solapur (Iran) 86.9% of cases were in the age group of (20-29) years, this may be due to different in nutritional habits in developing countries. In the present study, 43.3% of cases with age of first pregnancy group were in 18-21 years.

TABLE 3: Comparison between Age, Age of marriage and Age at first pregnancy in pregnant women with and without anemia

Variables		Women With Anemia		Women Without Anemia	
		No.	%	No.	%
Age (years)	20 and <	17	28.3	7	11.7
	20-30	23	38.3	30	50
	30 and >	20	33.3	23	38.3
Age at marriage(years)	13-16	18	30	14	23.3
	17-20	23	38.3	12	20
	21-24	7	11.7	15	25
	25 and >	12	20	19	31.6
	14-17	15	25	14	23.3
Age at first pregnancy(years)	18-21	26	43.3	13	21.7
	22-25	7	11.7	23	38.3
	26 and >	12	20	10	16.7

However, agreement with Amani, (2007) who showed that a pregnant younger age group (24) seems the highest prevalence rate of IDA 26.7%. It is also will known that iron needs are high in adolescent girls because of the increased requirements for expansion of blood volume associated with the adolescent growth spurt and the onset of menstruation (Husni, 2001). Early age at first marriage is considered to be at high risk for IDA due to lower body iron stores in young age (English and Bennett, 1990). Amani (2007) findings the youngest age group 14-16 years showed the highest compared to the rates of 21.6%, 23.5% and 17.8% among age groups 17-19, 20-22 and 23 or more. Furthermore, early marriage is known for its association with health problems includes premature pregnancies, which cause higher rates of maternal and infant mortality. A strong correlation between the age of the mother and maternal mortality and morbidity has been established and reported by many authors. For examples girls aged 10-14 are five times more likely to die in pregnancy or childbirth than women aged 20-24; while girls aged 15-19 are twice as likely place within marriage. In Nigeria, Camerron and Ethiopia, maternal mortality among adolescents under 16 was found to be six times higher than for young women aged 20-24. On the other hand teenage girls are also more vulnerable to sexually-transmitted infections (Husni, 2001). On the other hand

early age at first pregnancy seems to be associated with high prevalence of IDA.

Early age at first marriage is considered to be at high risk for IDA due to lower body iron stores in young age. Our findings the youngest age group 14-16 showed the highest prevalence rate 24.3% compared to the rates of 21.6%, 23.5% and 17.8% among age group 17-19, 20-22 and 23 or more respectively. Furthermore, early marriage is known for its association with health problems includes premature pregnancies, which cause higher rates of maternal and infant mortality. On the other hand early age at first pregnancy seems to be associated with high prevalence of IDA (Amani, 2007). On the other hand, women without anemia was 38.3% in age (22-25) years. However, high percentage of anemia in the women married in age (17-20) years followed in (13-16) years it was 38.3 and 30% respectively. However, in women without anemia the higher percentage of age of first gestation was 38.3% in (22-25) years. But, the high percentage of age of marriage in women without anemia percentage was in 25>years followed in (21-24) years 31.6 and 25%, respectively. These results indicated that the moderate age was the best in marriage or gestation from the lower age in women without anemia.

These results agreement with study of Muna (2013) who shows that the association of anemia and pregnancy trimester most pregnant women with anemia were at 3rd

but the lower percentage in the 1st trimester. However, the highest percent age 62.4% pregnant women in age group 20-29 years.

Comparison in gravidity, parity, place of residence and abortion and fetal loss between pregnant women with and without anemia

It was found that difference in gravidity percentage between pregnant women with anemia and pregnant women without anemia Table (4), in women with anemia the high percentage 53.3% was in women 4 and > but the high percentage in women with anemia was 58.3 in women gravidity 3 and <, this indicates that repeated pregnancy increase the risk of anemia in pregnant women. During pregnancy the physiological adjustments vary depending upon the health status of a pregnant female, genetic determinant of fetal size and maternal lifestyle.

Proper dietary intake and regular intake of hematinies is beneficial for both mother and fetus (Haq *et al.,* 2008). Most of the iron transfer from mother to fetus occurs during this period which corresponds to the time of peak efficiency of maternal iron absorption (Raza *et al.,* 2011). These results in agreement with the study carried out by Mei *et al.,* (2012) showing that multigravida ladies have a very high serum transferring receptor concentrations. In multigravida females in addition to this plasma expansion, iron deficiency can play a major role in lowering of the hemoglobin concentration and therefore making then more prone to develop anemia as compared to the primigravida (Blackburn, 2008). Muna (2013) showed about 21% of women had more than 6 pregnancies and out of these 77.4% were anemia. But, the normal pregnant was 54.1% when gravidity was 1-3, mild 24%.

TABLE 4: Distribution of sample according to gravidity, place of residence and abortion and fetal loss

Variables		Women With Anemia		Women Without Anemia	
		No.	%	No.	%
Gravidity	3 and <	28	46.7	35	58.3
	4 and >	32	53.3	25	41.7
	2 and <	4	6.7	3	5
Parity	3 – 5	20	33.3	33	55
	6 and >	36	60	24	40
Place of residence	Urban	26	43.3	25	41.7
	Rural	34	56.7	35	58.3
Abortion & Fetal loss	Yes	35	58.3	23	38.3
	No	25	41.7	37	61.7

Participant with 4 or more pregnancies seems expectation as irons stores being deleted and exhausted due to frequent and close intervals pregnancies and deliveries (Amani, 2007).

Table (4) shows that the high percentage of pregnant women with anemia when the family members (parity) increased, it is anemia percentage 60% when the parity 6 and over but it is less 6.7% in family members 2 and less. However, the high percentage 55% in group of women non anemia in family members from 3-5. These results are in agreement with the study carried out by Muthanna *et al.,* (2005) who showed the percentage of anemia of individuals from large family members was highest 50.4%, followed by families 11.7%, also, Powel, (1960) showed in Dublin city there is a link between high prevalence of anemia among individuals who are large families that is by increasing the number of family members, the concentration of hemoglobin is likely to decrease. The increase in the number of family members leads to a reduction in the per capita share of the food intake and thus affects the health condition. However, Muna (2013) showed the same result in sample of pregnant women that there was a highly significant in women were parity 4 and out of these 60.2% were anemia, but in parity 1-3 number was 29.1%. Logistic regression was found that anemia significantly related to the age, socio economic status, parity and lactation. Almost all the anemic women were suffering from iron deficiency, mainly due to nutritional factors and low socio economic status, multi parity, lactation and heavy

menstrual loss. This may reflect the effects of the sanction on the nutritional and social status in the rural area (Maida and Baybeen, 2007).

Table (4) shows that the place of residence is very important but there was no difference between the pregnant women lived in urban and rural in women without anemia and women with anemia these results are in agreement with the study carried out by Salwa (2009) showing that there was no significant difference in the mean Hb value of rural and urban pregnant women. In a study conducted by Klebanoff *et al.,* (2004) in Egypt, 65.2 and 33.5% had Hb level below 10g/dL in urban and rural areas, respectively. In Jordan, Harrison and Ibeziako (2000) showed the Hb level was less than 11g/dL in pregnant women from both urban and rural areas. However, in a study conducted in 2002 in west India, the mean Hb level was below 12 g/dL in pregnant women were from an urban area.

Table (4) shows that increase in abortion and fetal loss in pregnant with anemia it was 58.3% but that was 38.3% in women without anemia. These results are in agreement with the study carried out by Attia and Zidan, (2010) and Luay, (2012) they pointed out that the rise in abortions and infant deaths was due to malnutrition at same times. Malnutrition with iron deficiency leads to miscarriage and neonatal death. First trimester abortion occurs below 12 weeks gestation and accounts for the majority. The overall rate is 20%. Second trimester abortion is less common, occurring for 1-4% of all abortion. The general maternal factors, diabetes, anti-phospholipids syndrome, maternal

age increases the risk of abortion due to chromosomal abnormality incidence increase, maternal smoking and alcohol consumption.

RECOMMENDATION

1- Increasing level of awareness in women and their families about the risk of anemia in pregnancy.
2- Work to increase the awareness programs to reduce the incidence of anemia during pregnancy further studies have to done with more sample size because anemia during pregnancy is critical condition especially in case of severe anemia that increase the rate of morbidity and mortality.
3- Teach women in pregnancy age to dietary habits as a part of an overall approach to health promotion, and education pregnant women and infant by health lectures, T.V., Posters to avoid future anemia during pregnancy.
4- Educate pregnant women how dangerous iron deficiency blood anemia during pregnancy and what caused the miscarriages and other risks Health and encourage pregnant mothers about important family planning and good nutrition.

REFERENCES

Abdul Rahman, J.M. (2010) Some Parameters of Anemia during Pregnancy of Women in Tikrit Teaching Hospital , Tikrit Journal of Pure Science Vol. 15 No.(1).

Abdul Razzak, J. AL- Shawi Jinan. A.O., Mays, R.M. and Noor H.M. (2012) Study the Incidence and Types of Anemia in Pregnant Women in Baghdad Province J. of university of anbar for pure science : Vol.6:NO.1.

Abeer, A.G., Wafaa, F.T. and Muna, R.H. (2013) The Prevalence of Iron Deficiency Anemia among Pregnant Women in Ibn- Albaldy Hospital , Iraqi national Journal of nursing specialies , vol. 26 (1) p 71-79.

ACOG (2008) Anemia in pregnancy. American College of Obstetricians and Gynecologists Practice Bulletin;112: 201–7.

Aluka, C., Amadi, A. N., Kamanu, C.I. and Feyi-Waboso, P. A.(2001) Anemia in pregnancy in Abia State university teaching hospital Aba. J. Med Invest Pract 92:58- 61.

Al-Araji, H.I.S. (2002) A study of the biochemical functions of the liver of pregnant women in the province of Najaf, Master Thesis, College of Education, University of Kufa.

Amani, W.M. (2007) Iron Deficiency Anemia among Pregnant Women in Nablus District; Prevalence, Knowledge Attitude and practice .Msc. Thesis. An-najah national Univ. Fac. of Graduate studies, Nablus Palestine.

Attia, W.M.M. and Zidan, N. Kh. (2010) iron deficiency and some associated biochemical variables in Iraqi sheep females, Anbar Journal of Veterinary Sciences, 3 (1): (105 - 109).

Awaz, A. S., Hamdia, M.A. and Warda, H.A. (2015) Association between Severity of Anemia and Maternal Factors During Pregnancy in Maternity Teaching Hospital/Erbil City , Kufa Journal for nursing Sciences Vol.5 No. 2 .

Blackburn, S. (2008) Physiologic changes of pregnancy. In K Simpson and P Creehan (eds.), Perinatal Nursing (3rd ed.). New York: Lippincott .59–66.

English, R.M. and Bennett, S.A. (1990) Iron status of Austration children. Medical J. Australia 152, 582-586.

Fatemeh, M., Nahid, E., Sedigheh, G. and Jamileh, M. (2010) Prevalence of anemia risk factors in pregnant women in Kerman, Iran .Iranian Journal of Reproductive Medicine Vol.8. No.2. pp: 66-69.

Fatima, H. J. (2013) Effect of acute anemia on safety of pregnancy and delivery in adolescent at 14-18 years. Journal of Tikrit Pure Sciences ,18(1).

Hanmanta, V. Wadgave (2011) Burden of anemia among the pregnant women in rural Area. July-December; Volume 2 Issue 2, P. 76-77.

Haq, I.U., Butt, I.F., Hassan, K., Asif Notary, W. and Mateen, Y. (2008) Iron status in non-anemic pregnant females during the Third Trimester. Ann.Pak.Inst.Med.Sci. 4(2): 88-91.

Harrison K.A., Ibeziako, P.A. (2000) Maternalanemia and fetal birth weight. J ObstetGynaecol Br Commonw 2000; 80:798–804.

Klebanoff, M.A., Shiono, PH., Selby, J.V., Trachtenberg, AI. And Graubard, B.I. (2004) Anemia and spontaneous preterm birth, Am J ObstetGynecol , 164:59–63.

Luay, Q.A. Hameid (2012) Study of Disease Iron deficiency anemiafor pregnant women in Baquba city / Diyala state, Diyala. Theses MS.C University College of Education for Pure Science.

Lone, F.W., Qureshi, R.N. and Emmanuel, F. (2004) Maternal anemia and its impact on perinatal outcome in a tertiary care hospital in Pakistan. East Mediterr Health J. 10; 801-07.

Maida, Y.S. and Baybeen K.A. (2007) Anemia in women during reproductive years in rural area , Iraqi J. MED SCI, 2007; VOL. 5 (2):65-70 .

Mohammed, A.D.S., Abbas, A.F. and Mohammed H. (2015) Evaluation the Physiological Effect of Pregnancy on Some Hematological and Biochemical Parameters for Pregnant Women Iraqi Journal of Biotechnology ,Vol. 14, No. 2 , 374-390.

Mei, Z., Pfeiffer, C.M., Looker, A.C. and Flores-Ayala R.C. (2012) Serum soluble transferrin receptor concentrations in US preschool children and non-pregnant

women of childbearing age.Clinica Chimica Acta. 413(19-20): 1479-84.

Muna A. Zeidan (2013) Factors Associated with Anemia in A sample of Pregnant Women Attending Primary Health Centers. Iraqi National Journal of Nursing Specialties, Vol. 26, Special Issuera.

Muthanna , A. al -Omar ; Salim, S. Al-Timimi and Bahira M. AL-Timimi (2005) Incidence of nutritional anemia in Baghdad and Baquba populations and its correlation to some parameters, magazine um Salma for Sciences, Vol. (2) .

Najlaa, K.A and Iqbal, S.A. (2013) Prevalence of Anemia among Pregnant Women Attending Primary Health Care Center in Kirkuk City, Kirkuk university journal–scientific, Vol. 8 , No. 3 .

Powel, E.D. (1960) Levels of hemoglobin in an adoleseent population in Dublin. Journal of the Irish medical Association. 46:157-161.

Raza, N., Sarwar, I., Munazza, B. and Ayub, M. (2011) Assessment of iron deficiency in pregnant women by determining iron status .J Ayub Med College. 23(2): 36-40.

Salwa, H.Al-Mukhtar (2009) Anemia status of the pregnant and lactating women In Mosul city ,Tikrit Medical Journal . 15(1):163-166.

Sardesai, V.M. (1998) Introduction to clinical nutrition Marcel Dekker, Inc. New York.

World Health Organization (2001) Reduce maternal mortality. regional office for the Eastern Mediterranean , p.26-27.

World Health Organization (2002) The World Health Report:Reducing risks, promoting healthy life, pdf Geneva.