Feto-maternal outcome among Anemic Women attending labor

Dr. Methal A. Al-Rubaie   Dr. Layla Fadel

M. B. Ch. B., D.O.G., CABOG   M. B. Ch. B.

Department of Obstetrics and gynecology, Collage of medicine, University of Basra, Basra, IRAQ.

نتائج صحة كل من الام والجنين لدى الحوامل المصابات بفقر الدم واللاتي ادخلن في حالة ولادة

د. مثال عبد الرضا الربيعي

استاذ مساعد

النسائية والتوليد/ كلية الطب/ جامعةالبصرة

المستخلص

ان الهدف من هذه الدراسة هو تحليل مدى خطورة فقر الدم لدى الام الحامل على صحة كل من الام والجنين.لقد اجريت الدراسة على (٧٥٠) حامل تم تقسيمهم الى مجموعتين، الاولى تشمل(٣٥٠) حامل مصابة بفقر الدم و(٤٠٠) حامل غير مصابة بفقر الدم. كان فقر الدم الناتج من نقص الحديد هو اكثر الانواع شيوعا (٥٧%) كما ان (٥٤%) من المجموعة الاولى مصابات بفقر الدم من النوع البسيط.اثبتت الدراسة ان الحالة المعيشية الفقيرة وانعدام مراجعة مراكز الرعاية الصحية الاولية هي من اهم عوامل الخطورة التي تؤدي الى الاصابة بفقر الدم، كما اثبتت الدراسة ان المجموعة الاولى هي اكثر عرضة للإصابة بارتفاع ضغط الدم (١٥,٧%) ونزف ماقبل الولادة (١١,٧%) ونزف مابعد الولادة (١٦,٨%) مقارنة بالمجموعة الثانية. كان معدل العمليات القيصرية اعلى في المجموعة الاولى (٤٠,٩%) بسبب تعب الجنين داخل الرحم والنزف ماقبل الولادة. ان اهم مخاطر فقر الدم على صحة الجنين كانت موت الجنين داخل الرحم (٤,٨.%)،الولادة المسبقة (١٥,٤%) و نقص نمو الجنين داخل الرحم(٢%)، كما كانت اوزان الاجنة للمجموعة الاولى اقل وكذلك الابكار سكور بينما كانت نسبة ادخال اجنة المجموعة الاولى اكثر مقارنة بالمجموعة الثانية.نستنتج من هذه الدراسة ان فقر الدم اثناء الحمل لا يزال يشكل مشكلة صحية شائعة في مجتمع البصرة وذو تأثير سلبي على صحة كل من الام والجنين.

Abstract

The aim of this case-control comparative study is to analyze the risk of anemia during pregnancy on the health of both mother and fetus. Seven hundred-fifty pregnant women admitted in labor were included who were divided into three hundred fifty (350) as anemic group and four hundred (400) as non-anemic group. Among the anemic group 57.1% had iron deficiency type and 54% of anemic group had mild anemia. Low social class and lack of attendance to A.N.C. clinics were the major predisposing factors in anemic group as 48.6% were of low social class and 37.7% were not attended antenatal care clinics. This study revealed that anemic group was more risky to have pre-eclampsia 15.7%, post-partum hemorrhage 16.8% and ante-partum hemorrhage 11.7%. Anemic women had higher

cesarean section rate 40.9% mainly due to fetal distress 26.7% and ante-partum hemorrhage 23.8%. Intra-uterine death 4.8%, preterm delivery 15.4% and intra-uterine growth retardation 2% were the frequent fetal complications among anemic group with highly significant difference. Newborn of anemic women tend to have lower birth weight, low Apgar score with more admission to Neonatal Intensive Care Unit 29.1%. In conclusion anemia was still the common medical health problem among pregnant women in Basra society which carry high risk to both maternal and fetal health.

Introduction

Anemia is said to occur when the Hb content of blood is below the normal range expected for the age and sex of the individual, provided that the presence of pregnancy, the state of hydration and the altitude have been taken into account [1]. The hemoglobin level up to (11g/dl) was accepted by (WHO) as the normal level in pregnancy. Thus, any Hb level below (11g/dl) in the first trimester or below (10.5g/dl) in the second and third trimester should be considered as anemia [2]. However, in most of the developing countries the lower limit is often accepted as (10g/dl) because large percentage of pregnant women in this setting with Hb level of 10g/dl tolerate pregnancy, labor and delivery very well with good outcome [3]. (WHO) estimates that more than (40%) of non pregnant and over (50%) of pregnant women in developing countries are affected by anemia [4]. Nearly, half of all pregnant women suffer from anemia; (52%) in low-resource countries and (23%) in high-resource region [5]. Its prevalence in Africa was (57.1%), South-East Asia was (48.2%), Europe was (25.1%) and (41.8%) worldwide [6]. Anemia can be consequent to nutritional deficiency of iron, foliate or B12. It can be hemolytic either inherited as sickle cell & thalassemia syndrome or acquired secondary to auto-immune disease, or chronic secondary in liver and renal disease , or infection as Malaria and Hook Worm infestation[7]. According to severity; anemia can be mild if Hb level is (9-11g/dl), moderate if Hb level is (7-9g/dl), sever if Hb level is (4-7g/dl) and very sever if Hb level is less than (4g/dl). [7] Pregnant women in developing countries are at particular risk of anemia in pregnancy as result of poverty, malnutrition and depleted iron stores from too early, too many and too frequent pregnancies [8]. Irrespective of race and economic situation the prevalence of anemia in pregnancy is highest among teenage mothers [8]. The fetal consequences are well established and depend not only on the severity of anemia but also on duration of anemia state. A fall in Hb<11.0g/dl is associated with significant rise in prenatal mortality rate.

The prenatal mortality triple if Hb level is (<8g/dl) and increased by ten folds when anemia is very sever [9]. Similar findings have also been noted for both infant birth weight and preterm delivery rates. A significant fall in birth weight as result of increase preterm rate and intrauterine growth restriction has been reported with maternal Hb level below 8.0 g/dl[9]. Neonatal anemia may arise consequent to maternal anemia due to poor reserve. Infants with anemia have higher prevalence of failure to thrive, poor intellectual development milestone and higher rate of morbidity and mortality than infant without anemia [9]. The presence of, severity and duration of anemia affect maternal well being; there is substantial reduction in work capacity as anemia increase in severity and mother may unable to cope with household chores and child care. Those with moderate anemia experience higher rates of morbidity and mortality due to ant partum hemorrhage, pre-eclampsia and infections [10]. The maternal outcome in severe anemia depends on level of decompensation. If not recognized early and corrected, thus circulatory failure occur as the heart is unable to compensate leading to pulmonary edema and death. The women are unable to tolerate third stage of labor and blood losses associated with delivery [10].

Material and methods

This case- control comparative study was carried out in AL-Basra Maternity and Child Hospital from (**1st November 2013 till 1st November 2014**). Seven hundred fifty (**750**) gravid women were included in this study that was classified into anemic group (**350**) and non-anemic group (**400**). The level of hemoglobin was estimated routinely to all pregnant women attending in labor by Spectro-photometric analysis using special machine which contain two reagents, one called Stromatolyser and other called Cerpack and 100Ul of blood was added to this. In our study we regard the lowest normal Hb level as (10 g/dl), so that the anemic group were those who had Hb level (<10g/dl), while the non-anemic group had Hb level (> 10g/dl). Age and parity of non-anemic women were nearly approximated to that of the anemic group to assess the effect of anemia itself on labor outcome. To classify the anemic group according to the type of anemia; further investigations were done in form of blood film, G6PD study by add 100Ul of NaNo3 to 2c.c. full blood and leave for one minute then add 100Ul Methylene blue and put in incubator for three hours then read the intensity of color; if bright red it is regarded as normal, if brownish it is full ,if brownish-red it is intermediate, and Hb variant by withdraw 2c.c. blood in EDTA tube from which 0.01c.c.aded to

full automated machine that work by electrical capillary then the result was read as a curve. Social class is defined as people having the same social, economic and educational status. [11] The researchers of community medicine department of our collage had modified the classification of social class according to income in Basra society, so they classified the people into three social classes; low class if the income is less than (500,000D) monthly, middle class if the income is (more than 500,000- 1,000,000D) monthly and high if (more than 1,000,000D) per month. We considered adequate antenatal care as three or four times of attendance to antenatal clinics till the time of delivery according to (WHO) classification. The detailed information's about age, parity, social class, antenatal care, gestational age, obstetrical complications, mode of delivery, B.W. of the newborn, alive or dead newborn, apgar score and admission to NICU were listed in the special questionnaire printed formula. Evaluation of Apgar score including heart rate, respiratory effort, muscle tone, facial grimace and color was done by pediatric resident present in labor room. A score of (7-10) indicate favorable condition of newborn, a score of (4-6) indicate use of some measures of resuscitation and newborn will be in favorable condition while a score of (0-3) require immediate

resuscitation including intubation and admission [12]. IUGR defined as B.W. $<10^{th}$ percentile on intrauterine growth curves. IUGR may or may not SGA but always implies pathological process [13]. Z-test is used to assess the significance of difference between anemic and non-anemic group. Basically the significance level is a measure of how certain we want to be about our results. Low significance values correspond to low probability that experimental results happened by chance and vice versa. It is common that p=0.01 means that there is 99% chance that the results were caused by the scientist manipulation of experimental variables and if p- value is 0.05;this mean that experimental results have chance 5% of being reproduced in a random sampling process. [14]

Results:-

Iron deficiency type of anemia was the commonest among anemic group; it constitutes 57% as shown in table 1. Hereditary hemolytic types of anemia represent a significant percentage 39.1% collectively. Among these; sickle cell disease was more frequent 14% followed by thalassemia 10.2% then G6PD type 7.8%, and the least was sickle cell trait 7.1%. Pure foliate deficiency was rare3.8%. The severity of anemia according to Hb level was illustrated in

table 2; about half of anemic group 54% had mild anemia while 9.7% had sever type. Maternal demographic characters of both groups were shown in table 3; there was no significant differences regarding age and parity since we had already approximate both groups in their age and parity. Near the half of anemic group 48.6% were of low social class, while only 27% of non anemic group were of low social class with statistically high significant difference (P< 0.01). Anemic group had poor ANC, since 37.7% had no attendance to antenatal clinics at all compared to 23% in non anemic group, while about half 52% of non anemic group had adequate attendance compared to 24.3% among anemic group with statistically high significant difference (P < 0.01). Anemic group had greater tendency to develop pre-eclampsia (15.7% versus 10.5%), postpartum hemorrhage (16.8% versus 7.7%) and ante partum hemorrhage (11.7% versus 4.5%) compared to non anemic group as shown in table 4, with statistically high significant difference (P <0.01).Three cases of maternal death were reported secondary to sickle cell disease. Cesarean Section rate was higher among anemic group 40.9% compared to 27.5% in non anemic group as shown in table 5, while vaginal deliveries were more in non – anemic group (71% versus 56.6%) in

anemic group with statistically high significant difference (P< 0.01). Indications of Cesarean Section were listed in table 6. Of all Cesarean Section; fetal distress is the commonest indication in anemic group (26.7% versus 18.2%) with highly significant difference, followed by ante partum hemorrhage 23.8% in anemic group, while it was 16.4% in non anemic group with statistically significant difference (p<0.05). Repeated scar represent third frequent cause of Cesarean Section 20.9% of anemic group compared to 32.7% of non anemic group with statistically high significant difference. Prolong labor has no significant difference among two groups 19.6% in anemic group compared to 18.2% in control group. Neonatal outcome of both groups was shown in table 7. Anemic group had greater tendency to deliver dead newborn 4.8% compared to 2.5% in non-anemic group as well as they had more preterm newborns (15.4% versus 3.7%) and growth retarded newborns (12% versus 5.5%) compared to non-anemic group with statistically high significant difference (P<0.01). Birth weight tend to be lower in anemic group as 16% had B.W. <2000gm compared to 12% in non-anemic group and 27.7% had B.W. between 2000-2500gms compared to 23% in non-anemic group with statistically high significant difference (P< 0.01).

Apgar score within 1 minute was favorable more among non-anemic group (i.e. 7-10) (75% versus 58.8%) compared to anemic group with statistically high significant difference (P< 0.01). Those with apgar score (0-3) tend to be more among anemic group (9.2 versus 3.8%) with statistically high significant difference. Newborns of anemic group need more admission to NICU 29.1% compared to 20.7% in non-anemic group with statistically high significant difference (P< 0.01).

Table 1. Classification of Anemic group according to the type of Anemia.

Type of anemia.	No.	%
1-　Iron deficiency anemia.	200	57.1
2-　Sickle cell disease.	49	14
3-　Thalassemia	36	10.2
4-　G6PD	27	7.8
5-　Sickle cell trait.	25	7.1
6-　Foliate deficiency	13	3.8
Total	**350**	**100%**

Table 2. Classification of Anemic group according to the severity of Anemia.

Severity	No.	%
Mild (Hb = 9 – 9.9 g/dl)	189	54
Moderate (Hb = 7- 8.9 g/dl)	127	36.3
Sever (Hb = 4- 6.9 g/dl)	34	9.7
Very sever (Hb < 4g/dl)	0	0
Total	**350**	**100%**

Table 3.   Demographic characters of Anemic and non –Anemic group.

Character	Anemic group		Non anemic group		p.value
	No.	%	No.	%	
1. Age					
<18 years	64	18.3	76	19	NS
18 -25 years	114	32.6	124	31	NS
26-35 ears	92	26.3	108	27	NS
> 35 years	80	22.8	92	23	NS
Total	**350**	**100%**	**400**	**100%**	
2. Parity					
Primigravida	113	32.3	135	33.8	NS
1-4 delivers	105	30	125	31.2	NS
5-> delivers	132	37.7	140	35	NS
	350	**100%**	**400**	**100%**	
3. Social class					
Low	170	48.6	108	27	HS
Middle		11532.8	210	52.5	HS
High	65	18.6	82	20.5	SIG
Total	**350**	**100%**	**400**	**100%**	
4. Attendance to ANC	85	24.3	208	52	HS
Adequate	133	38	100	25	HS
Poor	132	37.7	92	23	HS
Nil					
Total	**350**	**100%**	**400**	**100%**	

NS= P=> 0.05   SIG = P =< 0.05   HS= P=< 0.01

Table 4. Obstetrical complications

Complication	Anemic group		Non anemic group		p.value
	No.	%	No.	%	
1. PE	55	15.7	42	10.5	HS
2. PROM	65	18.5	76	19	NS
3. P.P.H.	59	16.8	31	7.7	HS
4. A.P.H.	41	11.7	18	4.5	HS
5. Maternal death	3	0.85	0	0	HS

Table 5. Mode of delivery

Mode of delivery	Anemic group No.	%	Non anemic No.	%	p.value
N.V.D	198	56.6	284	71	HS
C/S	143	40.9	110	27.5	HS
Instrumental	9	2.5	6	1.5	SIG
Total	**350**	**100%**	**400**	**100%**	

Table 6. Indications of C/S

Indication of C/S	Anemic group No.	%	Non anemic No.	%	p.value
1. Fetal distress	38	26.7	20	18.2	HS
2. A.P.H.	34	23.8	18	16.4	SIG
3. Repeated scar	30	20.9	36	32.7	HS
4. Prolong labor	28	19.6	20	18.2	NS
5. Malpresentation	13	9.0	16	14.5	SIG
Total	**143**	**100**	**110**	**100**	

Table 7. Neonatal outcome

Events	Anemic		Non anemic		p.value
	No.	%	No.	%	
I.U.D	30	4.8	10	2.5	HS
Preterm newborn	54	15.4	15	3.7	HS
Growth retarded newborn	42	12	22	5.5	HS
B.W. < 2000 gm	56	16	48	12	HS
2000-2500 gm	97	27.7	92	23	HS
2600-3500gm	197	56.3	260	65	HS
Apgar score in 1min 7-10	206	58.8	300	75	HS
4-6	112	32	85	21.2	HS
0-3	32	9.2	15	3.8	HS
Admission to NICU	102	29.1	83	20.7	HS

Discussion

Maternal anemia in pregnancy is commonly considered as a risk factor for pregnancy outcome and can result in complications that threaten the life of both mother and fetus [15]. This study showed that iron deficiency anemia was the commonest where it constitute about **57%**; nearly approximated to that reported by another study **55%** in which the frequency of foliate deficiency anemia was **26%** compared to only **3.8%** in our study, while hereditary hemolytic anemia constitute only **19%**; less than what reported in this study **39.1%** [16]. Our explanation to such difference in the results may be attributed to difference in the sample size of anemic pregnant women involved in our study as well as difference in social status and ethicality of our community. Fortunately **54%** of anemic group had mild anemia while sever type constitute only **9.7%**; similar to what reported by another research where mild type form **35%** and sever type was the least **2.1** [17]. Also another study found that mild type was the commonest **43.2%** while severe type was **11.1%** [18]. Mild type of anemia fared best maternal and prenatal outcome; whereas sever type was associated with increased frequency of low B.W. newborns,

operative deliveries and prolong labor [19]. Nearly half **48.6%** of anemic group in this study were belong low social class which is considered one of major risk factor for developing anemia since individuals of this class are less educated, have higher levels of nutritional deficiencies including iron deficiency since they don't have the mean to achieve healthy diet, do not have access to medical and nutritional services to prevent or treat these condition or have greater level of infection and chronic diseases that increase the risk of nutritional deficiency [20]. In this study; anemic women with no attendance to ANC at all constitute **37.7%** while those with poor attendance form **38%**; this confirm the concept that inadequate antenatal care along with poor knowledge of dietary needs of pregnant women are responsible for developing anemia[21]. Anemic pregnant women tend to experience higher rate of morbidity in term of ante partum hemorrhage, pre-eclampsia, post-partum hemorrhage and infection as well as maternal death mainly in these with moderate and severe anemia[9]. This concept was confirmed in this study where **15.7%** had pre-eclampsia, **16.8%** developed post-partum hemorrhage and **11.7%** had ante partum hemorrhage. Cesarean section rate was significantly higher among anemic group of this study **40.9%**; this agrees with

another study which concluded that abnormal delivery including Cesarean section and instrumental delivery showed **4.8** folds higher risk in anemic women mainly with moderate and sever type [19]. Ante partum hemorrhage. was the frequent indication for Cesarean section among anemic women; it constitute **23.8%** of all Cesarean section similar to the finding reported in the above previous study [19]. Fetal distress is the commonest indication for C/S among anemic group **26.7%** of this study as there is deficient in O_2 and nutrient supply to the fetus. The favorable pregnancy outcome was less frequent among anemic mothers; anemic mothers tend to have greater Intra-uterine death. **4.8%** compared to only **2.5%** in non – anemic mothers. These results were similar to the results reported by other study where there were **3.7** times higher risk for Intra- uterine death in anemic women [22]. Preterm birth with subsequent low B.W. **(i.e. B.W. <2000g)** were more frequent in anemic group **(15.4%and 16%)** respectively similar to that reported by same above study in which preterm birth constitute **25%** among anemic women, while low B.W. was **13.4%** [22]. Growth retarded newborns were more frequent in anemic group **12%** compared to only **5.5%** in non – anemic group similar to that reported by another study, where there was growth retarded newborns

in **13.2%** among anemic group [22]. Newborns of anemic group tend to have low Apgar score at 1 minute (i.e. 0-3) in **9.2%** more than in non – anemic group **3.8%** approximated to that found by another study where low apgar score at 1 min. was **10.2%** [23]; certainly consequent to high frequency of preterm birth, low B.W. and growth retarded newborns; so that admission to NICU was more among those belong anemic group **(29.1% versus 20.7%).**

Conclusion: Anemia in pregnancy was still the major health problem in Basra society. It was associated with high risk of maternal and prenatal morbidity and mortality. Iron deficiency anemia was still the commonest type. Therefore, this high rate need to be tackled seriously by the health care workers especially at the primary health care centers because of possible health implications to the mothers and babies. Prophylaxis iron supplement and food fortification with iron have the prospects of improving maternal and child health &it is important to address on haematinic compliance by giving adequate counseling and education to mothers or perhaps with involvement of their partners.

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