

## Anemia in Pregnancy and its Outcome at Al-Sadaqa Teaching Hospital Aden, Yemen

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### Abstract

**Background:** Anemia is a global public health problem affecting both developing and developed countries revealing major consequences for human health, social and economic development. The aim of this study was to investigate anemia during pregnancy and its association with birth outcome as low birth weight and preterm birth, and to determine some contributing factors as maternal age, gravidity and antenatal care.

**Methods:** This study was conducted at Al-Sadaqa Teaching Hospital, Aden from January 1st to December 31st, 2014. Data was collected from the medical records and analyzed using SPSS version 20.

**Results:** A total number of 2869 pregnant women were enrolled in the data collection where 2478 (86.3%) were documented to be anemic with (Hg<11 g/dl), with 4.9% severe anemia (Hg<7 g/dl), 70.7 % moderate anemia (Hg=7-9.9 g/dl) and 24.4% mild anemia (Hg=10-10.9 g/dl). Women less than 19 years, ≥19 -34 years and >35 years had moderate anemia (71.2%, 70.5%, 71.3%) respectively. A high proportion of them 2271 (79.15%) were from Aden Governorate. Mothers who had moderate anemia with an unfavourable outcome lead to a higher percentage of newborns (78.9%) who died. Rate of death was 1.5%. The mean birth weight of newborns was 3.0 ± 0.5kg and those with low birth weight <2.5 kg comprised (7.5%). Their mean gestational age was 39 ± 2.5 weeks with 8.2% resulting in preterm delivery <37 weeks of gestational age. Mothers who had ≥ 4 gravidity presented with a higher percentage of moderate anemia (73.9%) compared with those <4 gravidity (69%). Pregnant women without antenatal care having moderate anemia comprised (71.8%) compared to those with prenatal care (68.3%). A greater percentage of mothers having no medical disease presented moderate anemia in (71.4%), severe anemia (3.7%) compared with those having other medical diseases revealing moderate anemia in (68.5%) and severe anemia (8.5%).

**Conclusions:** In the present study, the prevalence of anemia among pregnant women was high in 86.3% with moderate anemia the commonest one. Anemia in pregnancy continues to be a major health problem in Aden, and socio-economic factors may contribute to the situation. Therefore, we should vigorously promote early prenatal care for these at-risk pregnant women.

**Keywords:** Low birth weight; Preterm; Anemia; Pregnancy; Neonatal deaths

### Introduction

Anemia is a major public health and medical problem and one of the most prevalent nutritional deficiencies that affects 25% to 50% of the population globally and approximately 50% of the pregnant women [1]. Anemia affects both developed and developing countries that has great effect on the health of the humans and social and economic development [2]. Maternal anemia during the period of pregnancy is a common risk factor that can cause threatening outcomes in both the mother and fetus [3].

Anemia in pregnancy is reported to be associated with increased rates of maternal and perinatal mortality, premature delivery, low birth weight, spontaneous abortions and other adverse outcomes [4]. A high proportion of women in both industrialized and developing countries become anemic during pregnancy [5]. Estimates from the World Health Organization (WHO) report that from 35% to 75% (56% on

average) of pregnant women in developing countries, and 18% of women from industrialized countries are anemic [1].

There is a great variation in the prevalence of anemia in pregnancy due to the differences in the socioeconomic conditions, lifestyles, and health-seeking behaviors across different cultures [6]. This difference may be also explained by the fact that there are lack of data from resource limited areas where the percentage of anemia in pregnant mothers may be relatively higher than expected [7].

Reports from different countries documented that there are many associated factors with anemia among pregnant women such as parasite infestation, season, dietary habits, gestational age, parity, gravidity, age at the time of marriage, geographic location, interval between pregnancies, level of educational level, and smoking [8].

Globally the most common nutritional deficiency is due to iron deficiency particularly among pregnant women due to increased iron requirements [9]. Some physiological changes occur during the period of pregnancy that increase the demand of iron and in turn intensify risk for the maternal anemia [10]. The needs of the growing fetus and

the placenta together with the increasing maternal blood volume and red cell mass cause a great demand on the maternal iron stores during the period of pregnancy [11]. The metabolism of fetal iron depends on iron delivery from the mother through the placenta. Thus the results of fetal anemia is related to the iron deficiency in the mother that may result to increased mortality linked to severe iron deficiency anemia [4].

During pregnancy, the fetal demand for iron increases maternal daily iron requirements around 10-fold, increasing from 6 mg/day to 22 mg/day in first and third trimesters of pregnancy, respectively [3]. The effect of anemia during pregnancy on maternal and neonatal life are often serious and long lasting ranging from varying degrees of morbidity to mortality, whereby severe anemia (Hb<7 g/dl) during pregnancy increases the risk of preterm delivery, low birth weight, intrauterine fetal death, neonatal death [12-16].

An association between maternal anemia and low infant Apgar scores was reported in some studies. A literature report concluded that in 102 Indian women in the first stage of labor, higher maternal hemoglobin concentrations were correlated with better Apgar scores and with a low risk of birth asphyxia [17]. A study in Niger compared the outcome of pregnant women being treated with iron or a placebo, which resulted in Apgar scores significantly higher in those newborns whose mothers received iron [18]. Thus anemia is one of the most common nutritional deficiencies affecting mothers during the period of pregnancy with many associated risk factors that contribute to major complications resulting in poor outcomes in the mother and baby emphasizing the early detection and prompt diagnosis and management.

The aim of this study was to investigate maternal anemia and its relation with maternal outcome such as low birth weight and preterm birth.

## Patients and Methods

A retrospective descriptive study was conducted on 2478 pregnancies delivered during the period January 1st to December 31st, 2014 at Al-Sadaqa Teaching Hospital, Aden, Yemen. Women with hemoglobinopathies such as thalassemia were excluded from analysis.

Anemia in pregnancy is defined by hemoglobin value less than 11.0 g/dL on the day of admission for labor classified as mild anemia (Hb=10-10.9 g/dl), moderate anemia (Hb=7-9.9 g/dl) and severe anemia (Hb<7 g/dl). Low birth weight defined as <2500 g in the first hours after delivery and gestational age defined as birth at less than 37 completed weeks of gestation.

The primary data source was the medical records of mothers retrieved from the statistic department. The variables that were studied included age of mother, gender of newborn, birth weight, gestational age, number of gravities and outcome of the newborn. The outcome (death) was recorded and interpreted as during the first hours that newborn stayed in the maternal side for resuscitation or if was delivered already dead. Data was analyzed using SPSS (Statistical Package for Social Sciences version 20). Chi-squared test was used to test statistical association between categorical variables. P value <0.05 indicates statistical significance.

## Results

A total of 2869 births were reported during the study period where the pregnant women with anemia having (Hb<11g/dl) constituted 2478 (86.37%) of the total women admitted in labor room for delivery. The results showed 4.9% had severe anemia (Hb<7 g/dl), 70.7 % had moderate anemia (Hb=7-9.9 g/dl) and 24.4% had mild anemia (Hb=10-10.9 g/dl).

The age distribution showed that a smaller percentage of 264 (10.7%) out of 2478 anemic mothers were less than 19 years of age, and a higher proportion of 1859 (75.0%) of women were in the age group of ≥ 19-34 years and only 355 women (14.3%) were more than ≥ 35 years-old where the difference did not show any statistical significance.

The permanent address of pregnant women residing in Aden governorate comprised 2271 (79.15%) with 539 (23.7%), 1623 (71.5%) and 109(4.8%) having mild, moderate and severe anemia respectively showing a difference that was statistically significant. The percentage of alive babies among mild, moderate and severe anemia were 24.6%, 70.6% and 4.8% respectively while babies who died comprised 10.5%, 78.9% and 10.5% respectively revealing the highest proportion of alive newborns and neonatal deaths among mothers with moderate anemia with a statistically significant difference.

The pregnant women with mild, moderate and severe anemia who delivered preterm babies less than 37 weeks of gestational age constituted 21.7%, 70.9% and 7.4% respectively which did not show any statistical significance. The mean birth weight of the newborns in the current study was 3.0 ± 0.5 kg with the number of babies born with low birth weight less than 2.5 kg were 178 constituting (7.5%). Although a higher proportion of babies with either birth weight <2.5 kg or >2.5 kg were documented in mothers with moderate anemia 132 (70.6%) and 1620 (70.7%) respectively showing a remarkable difference between the different grades of anemia but was not statistically significant.

The prevalence of preterm delivery among anemic patients was only 8.2% (203 out of 2478) with mean gestational age 39 ± 2.5 weeks. The highest percentage of mothers having moderate anemia were comparable in both preterm 144 (70.9%) and full-term babies 1608 (70.7%) and the lowest percentage of severe anemia were similar in both <37 weeks of GA 15 (7.4%) and >37 weeks of GA 106 (4.7%) which did not show any statistical significance.

The results of mild, moderate and severe anemia in the pregnant mothers with <4 gravidity compared to those with ≥ 4 gravidity were (26% versus 21.1%), (69.1% versus 73.9%) and (4.9% versus 4.9%) respectively which showed a difference that was statistically significant. Pregnant women with mild, moderate and severe anemia who did not receive antenatal care compared to those who attended antenatal care were (23% versus 27.4%), (71.8% versus 68%) and (5.1% versus 4.3%) respectively which showed a difference that was statistically significant. The comparison of mild, moderate and severe anemia in pregnant health mothers who did not complain of any medical disease to those having medical diseases (24.9% versus 23%), (71.4% versus 68.5%) and (3.7% versus 8.5%) respectively and revealed a difference that was statistically significant (Table 1).

Sociodemographic overall	features	Mild anemia	Moderate anemia	Severe anemia	Total	100%	P Value
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	N=605 (24.4%)	N=1752 (70.7%)	N=121(4.9%)	N=2478		
<b>Age in Years</b>						
<19 years	65 (24.6%)	188 (71.2%)	11 (4.2%)	264	10.7	0.906
≥ 19-34 years	458 (24.6%)	1311 (70.5%)	90 (4.8%)	1859	75.0	
≥ 35 years	82 (23.1%)	253 (71.3%)	20 (5.6%)	355	14.3	
<b>Address</b>						
Aden	539 (23.7%)	1623 (71.5%)	109 (4.8%)	2271	91.6	0.020
Other governorate	66 (31.9%)	129 (62.3%)	12 (5.8%)	207	8.4	
<b>Outcome</b>						
Alive	601 (24.6%)	1722 (70.6%)	117 (4.8%)	2440	98.5	0.050
Death	4 (10.5%)	30 (78.9)	4 (10.5%)	38	1.5	
<b>Gestational Age</b>						
<37 weeks	44 (21.7%)	144 (70.9%)	15 (7.4%)	203	8.2	0.172
≥ 37 weeks	561 (24.6%)	1608 (70.7%)	106 (4.7%)	2275	91.8	
<b>Birth weight</b>						
<2.5 kg	45 (24.1%)	132 (70.6%)	10 (5.3%)	187	7.5	0.951
≥ 2.5 kg	560 (24.4%)	1620 (70.7%)	111 (4.8%)	2291	92.5	
<b>Gravidity</b>						
<4	434 (26%)	1153 (69.1%)	81 (4.9%)	1668	67.3	0.028
≥ 4	171 (21.1%)	599 (73.9%)	40 (4.9%)	810	32.7	
<b>Antenatal visit</b>						
No	389 (23%)	1214 (71.8%)	87 (5.1%)	1690	68.2	0.050
Yes	216 (27.4%)	538 (68.3%)	34 (4.3%)	788	12.3	
<b>Maternal Diseases</b>						
No disease	464 (24.9%)	1333 (71.4%)	69 (3.7%)	1866	75.3	0.000
With disease	141 (23.0%)	419 (68.5%)	52 (8.5%)	612	24.7	

**Table 1:** Distribution of pregnant mothers by sociodemographic characteristics and newborn outcome.

## Discussion

Anemia is a common medical problem and one of the most common complications during pregnancy and could reflect adverse pregnancy outcomes on the mother and newborn. It is a public health problem not only in developing but also in industrialized countries [19].

The overall prevalence of anemia in this study was 86.4%, which is considerably higher to studies conducted in Iran (4.7%), Ethiopia (16.6%), Kuwait (24.1%), Malaysia (35%), Jordan (34.7%), Vietnam (43.2%), Nigeria (76.9%) and Sudan (62.6%) [2,20-27] respectively. The possible reason for this difference may be due to several factors as variations across different geographic areas, socio-economic status, poverty, lack of medical facilities and poor access to health services.

Although a higher percentage (75%) of anemic mothers in this study were in the age group of ≥ 19-34 years but the difference was not significantly associated with anemia as similarly reported in Ethiopia and rural Jordan [2,6]. On the contrary Mahfouz et al found that the highest prevalence of anemia was among Saudi women who were less than 20 years of age [28]. This could be explained by the fact of early marriage in some countries as well as the different sample size and setting areas.

Moderate anemia is considered to be a public health problem in the Hebron region of Palestine which is comparable to this study [9]. Although the percentage of moderate anemia was highest in all the different age groups followed by mild and severe anemia but there was no significant association between the mother's age and the level of anemia in this study.

The rate of death was 1.5% of total deliveries. The death cases that occurred in first hour after delivery or those who were delivered already dead in addition to all the serious cases underwent neonatal resuscitation with transfer to the intensive care unit in the neonatal ward. Perinatal deaths were similarly documented in maternal anemia in several reports [10,12]. Literature reviews revealed perinatal deaths could be associated with maternal anemias but were mainly caused by preterm deliveries and birth asphyxia due to the inadequate resuscitation equipment and neonatal care [12].

Preterm delivery constitutes a big universal healthcare problem of maternal and perinatal and infant mortality. In the current study the prevalence of preterm delivery among anemic mothers reported to be an important maternal outcome was 8.2% which was higher than in Iran (5.9%) and Nepal (3%) [2,25], lower than that in Palestine (13.1%) and very minimal in comparison with a study done in Nepal where the prevalence was 29.2% among anemic women [9,25]. This could be explained by the fact of limited sample size in this study whereby many mothers often prefer to home deliveries and some to private polyclinics and hospitals.

Several reports have documented the association of anemia during pregnancy with low birth weight [29]. In this study, the rate of low birth weight among anemic mothers was 7.5% which was similar to study done in Khartoum (8.3%) while lower than that in Central Sudan (12.6%) and Bangalore in India (46.3%) [27,30,31].

In this study a significant association was found between anemia and gravida which is similar to a report by Khader among Palestinian women [32]. On the contrary it did not fall in agreement with the literature studies from Ethiopia, Jordan and Sudan who showed no significant difference between maternal gravidity and anemia [2,6,27].

A statistically significant difference was documented among the different levels of anemia in pregnant healthy mothers with no evidence of any medical disease to those having medical diseases which is in contrast to a study among Jordanian mothers [6].

A high proportion of pregnant anemic mothers (68.2%) did not receive any antenatal visits. It is of paramount importance for effective and adequate antenatal care which is essential for early identification and treatment of anemia and other maternal diseases which occurs during pregnancy and affect pregnant outcome such as preterm and low birth weight. It is also recommended to provide mothers with continuous health education on the risk factors that may lead to unfavorable outcome following pregnancy and delivery requiring early screening when they attend their antenatal visits to the polyclinics and hospitals. Further studies are required to study the effects of maternal anemia on the future growth and development of infants and on the life quality of the mother

## Conclusions

In the present study, the prevalence of anemia among pregnant women was high in 86.3% on labor with moderate type of anemia representing the commonest one. The results documented the association of maternal anemia in pregnancy with increased risk of delivery of premature (8.2%) and low birth weight babies (7.5%). There is a great necessity to strengthen the health care seeking behavior of women, to ensure early diagnosis and management of medical condition to improve pregnancy outcome and to reduce the prevalence of anemia. This study showed that anemia in pregnancy continues to be a major health problem in Aden, and socio-economic factors may

contribute to the situation. Therefore, we should vigorously promote early prenatal care for these at-risk pregnant women. This would allow to screen mothers for nutritional anemia followed by routine iron and folic acid supplementation during pregnancy and give instructions to the mothers on the content of iron in a balanced diet, and increase their awareness on the available green leafy vegetables, fruits and cereals which would potentially reduce the prevalence of anemia.

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