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A survey study of the characteristic, causes, and symptoms of anemia among pregnant women and its effects on women and fetus

Hawra S. Mahfouz, Arwa A. Alnuimy

Biology Department, Education for Pure Sciences College, Mosul University, Mosul, Iraq.

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A B S T R A C T

Pregnancy is a physiological condition characterized by a high demand for energy and an increased need for oxygen. This demand escalates as pregnancy progresses to meet the requirements of both the mother and the fetus. Anemia, on the other hand, results from an imbalance in red blood cells is often cause by iron deficiency. When iron levels are low, it leads to a decrease in hemoglobin, which, in turn, impairs the body's ability to provide the necessary oxygen for its vital processes. The study involved 96 pregnant women who surveyed using a questionnaire. Among them, 74 exhibited signs and symptoms of anemia, while 22 were included in the control group. Additionally, through the calculation of proportions, we analyzed the symptoms that later manifested in both the mothers and the fetuses. It discovered that the anemia was most prevalent in the age group of 36 to 45. The results of the research sample indicated that miscarriages and stillbirths occurred, although in relatively low numbers. The most prominent symptoms reported by the pregnant women with anemia were headaches and dizziness, while the affected fetuses exhibited jaundice and low blood pressure. In brief**,** anemia is a condition that can affect pregnant women of all ages and often caused by a lack of access to health information and an inadequate diet for their stage of pregnancy.

1 Introduction

Numerous normal physiological, hormonal, metabolic, and psychological changes take place throughout pregnancy. While there is not a one-size-fits-all diet for pregnant women, they do require additional energy and nutrients due to the growth of the baby, placenta, and other supporting tissues during this period maternal malnutrition during pregnancy can lead to several adverse outcomes, including premature birth, low birth weight, and congenital abnormalities in the fetus. These complications can pose a risk to the infant's survival (Al-Dulaimi, 2016). Anemia is a global public health concern that an impact both developing and industrialized nations, with significant repercussions for human health. It also represents a social and economic burden. Anemia characterized by a reduction in the quantity or quality of red blood cells (RBCs). This reduction in the capacity of red blood cells to transport an adequate amount of oxygen can lead to insufficient oxygen supply for the diverse biological systems, which vary depending on factors such as age, gender, and pregnancy. Historically, anemia was primarily, attributed to iron deficiency, believed to be the most common cause globally. However, anemia can also be the result of insufficient folic acid, vitamin B12, or vitamin A, as well as recurrent infections (Bekele *et al*., 2016), and it may be linked to parasite infections and genetic disorders. According to

Corresponding author: **E-mail:** arwabio2021@gmail.com

the WHO, anemia characterized by a reduction in the number and size of red blood cells or a decrease in hemoglobin levels below the normal range, leading to a diminished capacity of the blood to transport oxygen throughout the body (WHO, 2014). The severity of the condition also influenced by the symptoms it presents. Common symptoms of anemia include headaches, lightheadedness, drowsiness, pallor, palpitations, shortness of breath, and difficulty in focusing (Fishbane and Spinowitz ,2018) Acute anemia occurs when there is a rapid reduction in red blood cells, often due to acute bleeding or hemolysis. On the other hand, chronic anemia develops gradually due to a consistent decline in the number of red blood cells. This decline can be attribute to factors such as iron deficiency, nutritional deficiencies, or chronic medical conditions. (Killeen and Tambe, 2023). Anemia affects people of all ages, but pregnant women are the most vulnerable (Mettananda *et al.*, 2018Anemia is a widespread global concern, affecting approximately 2.1 billion people, including 6 million pregnant women. Alarmingly, it stands as the leading cause of maternal fatalities in roughly 20% of cases (Jiji and Rajagopal, 2014). Furthermore, anemia impacts nearly one-third of the world's population, with over half a billion women of reproductive age affected globally (WHO, 2004). The regions of South Asia, Central Africa, and West Africa exhibit some of the highest incidence rates. In 2011, among the 32.4 million pregnant women aged 15 to 49 worldwide, approximately 496 million (29%) were anemic (Stevens *et al*., 2013).

Objective: The current study was to investigate some of the characteristics and symptoms and effective of anemia encountered by pregnant women and their fetuses.

2 Materials and Methods

In the current study focusing on pregnant women, we employed a questionnaire to collect data on pregnant women with anemia and assess the impact of anemia on their pregnancies, fetuses, and childbirth outcomes. The study included 96 participants, with 74 of them exhibiting signs and symptoms of anemia, while the remaining 22 served as the control group (comprising healthy pregnant women). The questionnaire was design to encompass the following sections: age of anemia onset, underlying causes, maternal pathological symptoms, association with miscarriages, impact on newborns, and potential fetal outcomes including deformities.

3 Results

1- **The age** at which the injury occurred: According to the findings of the present study, ages 17 to 25 had the lowest risk of disease, while ages 36 to 45 had the greatest prevalence. (Table: 1), (Figure: 1).

Table: **(1**) Shows the percent % of ages at which the anemia occurred.

Age	Frequency	Percent %
36-45	33	44.6%
26-35	24	32.4%
17-25	13	17.6%
46-55	4	5.4%

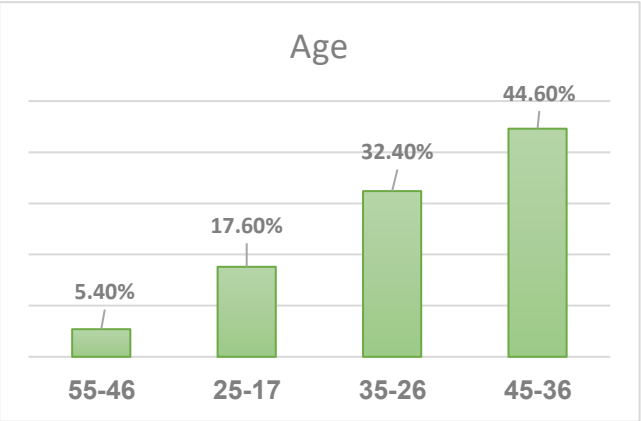

Figure (1) : Shows the percent % of ages at which anemia occurred.

2- Causes of injury

According to the findings of the present study, the most prevalent cause of anemia among the participants was a reduced appetite, which could be associated with pregnancy cravings or occur independently. Following closely was food scarcity, which could be attribute to various factors, including a low economic status. Additionally, some women reported a lack of knowledge about suitable dietary choices as a contributing factor, while others attributed their anemia to a history of recurrent abortions (Table: 3) (Figure 3).

Table (2): Shows the percent % of the causes of injury.

Causes	Frequency	Percent %
Lack of appetite due pica	38	51.4%
Unavailability of food	22	29.8%
Abortion	14	19%

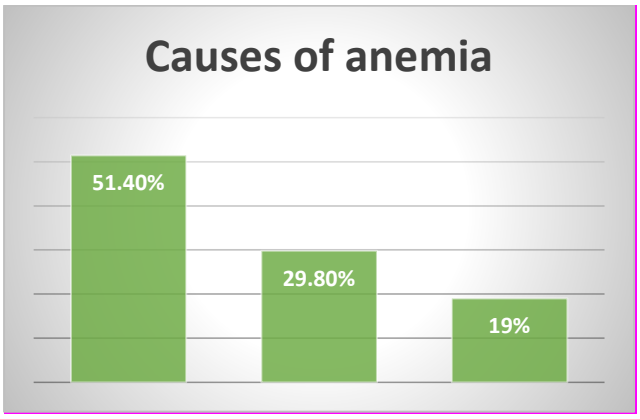

Figure (2): Shows the Percent % of the causes of anemia

3- Symptoms of the mother's disease

The study's findings revealed that the most common symptoms observed in pregnant women with anemia are headache, dizziness, shortness of breath, lack of concentration and lethargy, rapid heartbeat, blurred vision, bone pain, and loss of balance (Table 3), (Figure3).

Table (3): Symptoms of injury

Symptoms	Frequency	Percent %
Headache	53	% 71.6
Gid	46	% 62.2
Dyspnea	43	% 58.1
Inertia	37	% 50
palpitations	26	% 35.1
Blurred vision	24	% 32.4
Bone pain	19	%25.7
Loss of balance	10	% 13.5

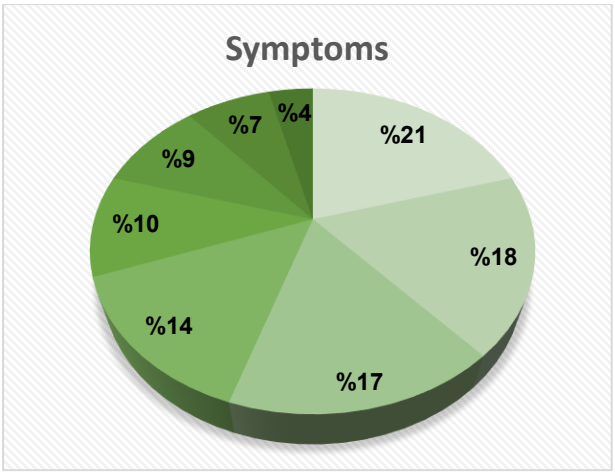

Figure (3): Shows the Percent % of disease symptoms

4- Abortion

The current study found that the incidence of miscarriage was low among pregnant women with anemia, which might be due to the fact that anemia does not target the important phase of pregnancy that causes miscarriage, namely the first trimester (the first three months) (Table: 4). (Figure: 4).

Table (4): Shows the incidence of abortion

Abortion	Frequency	Percent %
No	48	% 64.9
Yes	26	%35.1

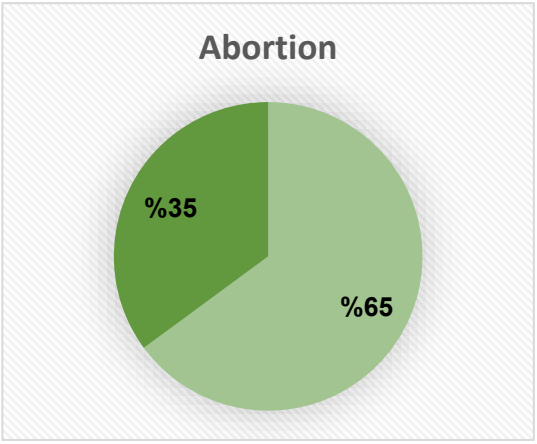

Figure (4): Shows the incidence of abortion

5- Diseases affecting newborns

The current study found that anemia in pregnant women resulted in anemia infection in infants, and other diseases including low weight, and anemia. (Table: 5). (Figure 5).

Table (5): Shows the incidence of congenital diseases

Disease	Frequency	Percent %
Jaundice	60	81.1%
Weight loss	53	71.6%

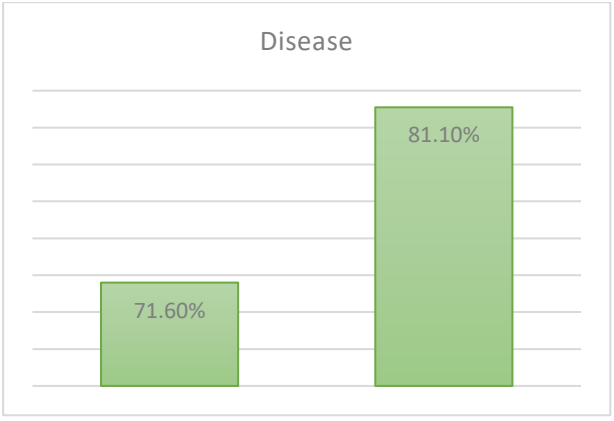

Figure (5): Shows the incidence of congenital diseases

6- Deformed births

The results of the current study did not indicate the occurrence of congenital malformations in the fetuses, and this may be due to several reasons. The disease, however, have not classified as a significant risk factor for congenital anomalies.

7- Stillbirths

The findings revealed that a handful of women had stillborn kids, although this was not a common occurrence. Pregnancy is a significant moment in a woman's life. This period is characterized by a variety of physiological, hormonal, metabolic, and psychological changes, and the pregnant woman does not adhere to a certain diet (Table: 6), (Figure: 6).

Table (6): Shows the Percent % of stillbirths

Stillbirths	Frequency	Percent %
No	49	%64.9
Yes	25	% 33.8

Figure (6): Shows the Percent % of stillbirths

4 Discussion

In the findings of the current study, it observed that individuals aged 17 to 25 had the lowest likelihood of infection, while those aged 36 to 45 exhibited the highest incidence of anemia. These findings align with previous studies (Hasswane *et al*., 2015) that investigated pregnant women in Morocco, where the age range of the study participants was 18 to 45 years. This variation may be attribute to differences in dietary customs across countries and regions. The underlying cause of anemia in pregnant women is an imbalance in hemoglobin and red blood cell production, often resulting from insufficient iron intake during pregnancy, a crucial nutrient for their formation. Alternatively, it may be link to the body's increased blood production during pregnancy to support the nutritional needs of both the mother and the developing child (Al-Mahjoubi *et al*., 2020). The study identified the most common causes of anemia, with the primary factor being a loss of appetite attributed to pregnancy cravings. This followed by food shortages resulting from poor economic conditions, a lack of information about suitable dietary choices, and anemia related to a history of recurrent abortions. These findings align with previous research (Zekarias *et al*., 2017). Studies suggest that anemia is often associated with a pregnant woman's history of abortions. The reason for this correlation is that blood loss during abortions depletes iron reserves, leading to anemia (Tadesse *et al*., 2017; Berhe *et al*., 2019), According to the study's findings, common symptoms in pregnant women with anemia include headaches, dizziness, shortness of breath, difficulty focusing, drowsiness, rapid heartbeat, blurred vision, bone pain, and loss of balance. These findings are consistent with the research conducted by other investigators (Gohar, 2014). The symptoms of anemia are contingent upon the severity of the condition, the rate at which it develops, and the individual's age. In cases of mild anemia, no noticeable symptoms or signs may emerge. However, as anemia progresses to a moderate stage, patients may experience a range of symptoms, including fatigue, shortness of breath, lethargy, headaches, pallor of the mucous membranes (including oropharyngeal mucosa), and muscle weakness (stoltzfus *et al*., 2007). Severe anemia can result in low blood pressure, renal failure, constipation, nausea appetite loss, elevated heart rate, and occasionally even death (Beers *et al*., 2006). These factors are not merely symptoms; they also indicate the severity and risks associated with the disease. Anemia poses a significant risk to expectant mothers, as one study has shown that it accounts for 20% of maternal fatalities, primarily due to insufficient blood reserves in mothers. Low hemoglobin levels in women, measuring less than 4 g/dL, can lead to partial heart failure, which may ultimately result in the death of the mother (Buseri *et al*., 2008). The recent study found that the occurrence of miscarriages was relatively low among pregnant women with anemia. This could be attributed to the fact that anemia does not typically affect the critical period for miscarriage, which is the first trimester (the first three months) of pregnancy. Most studies have shown that anemia tends to manifest more frequently during the third trimester (Al-Mehaisen *et al*, 2011; Seemal, 2012). This may be associated to the mother's increasing nutritional requirement against the backdrop of the mother's adverse eating habits in the first and second periods (Gatea *et al*., 2013). According to the current study, anemia in pregnant women can lead to

anemia in newborns and contribute to other related disorders, such as jaundice and low birth weight. Low birth weights can also result in complications affecting the digestive system, hormonal production, and metabolic processes (Allen, 2001). These metabolic changes may lead to a reduction in Glucose-6-Dehydrogenase (G6PD Phosphate), which is a cytoplasmic enzyme responsible for initiating the breakdown of hexose sugars in both the monophosphate hexose sugar pathway and the pentose phosphate pathway. These pathways result in the production of the reduced form of NADP, which plays a critical role in the synthesis and maintenance of reduced glutathione. Glutathione, in turn, serves to protect the red blood cell membrane from the toxic effects of oxidants. (Polin and Ditmar, 2001), The breakdown of red blood cells causes hemoglobin to decompose into the globin and heme parts, which change into bilirubin colors, and an increase in hemoglobin degradation may result in the onset of anemia symptoms (Robinson, 1990). In the absence of other causes of congenital jaundice, its level has evolved (Ho *et al*, 2007), G6PD enzyme deficiency has been demonstrated to produce acute and chronic hemolysis as well as neonatal hyperbilirubinemia (Dors *et al*., 2008). According to the findings, a small number of mothers experienced stillbirths, although this was not a common occurrence. Pregnancy is a significant phase in a woman's life, marked by a multitude of physiological, hormonal, metabolic, and psychological changes. Pregnant women do not necessarily adhere to a specific diet, but maternal malnutrition during pregnancy can contribute to fetal congenital abnormalities, preterm delivery, low birth weight, or even early mortality (Al-Dulaimi, 2016).

5 Conclusions

The current study identified the highest rates of infection in pregnant women between the mid-thirties and mid-forties. These infections were associated with symptoms that affected the pregnant mothers, including headaches, dizziness, shortness of breath, and difficulty concentrating. Additionally, there were cases of congenital malformations, although the cause of stillbirths was not determined.

Conflict of Interest: The authors declare that there are no conflicts of interest.

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