University of Kerbela/College of Nursing

The Relationship between Awareness and Health Beliefs with Anemia Prevention Behavior of Pregnant Women

A Thesis submitted

By

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To the Council of the College of Nursing/University of Kerbela, in Partial Fulfillment of the Requirements for the Master degree in Nursing Sciences.
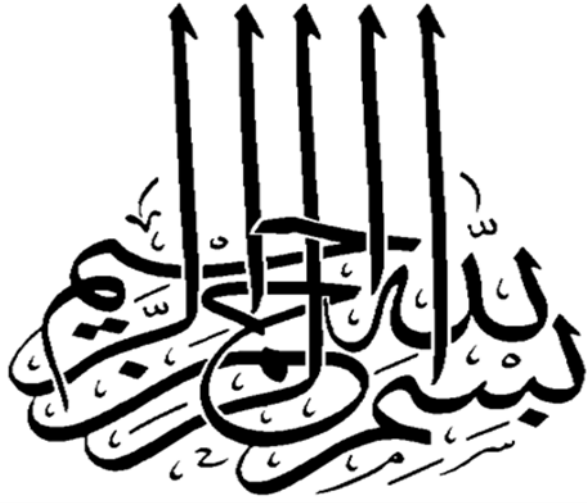
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بسم الله الرحمن الرحيم

{ يَا أَيُّهَا النَّاسُ قَدْ جَاءَتْكُمْ مَوْعِظَةٌ مِنْ رَبِّكُمْ وَشِفَاءٌ لِمَا

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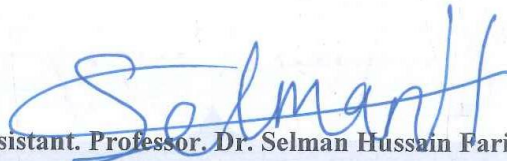
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Dedication

To ……….*My biggest supporter dear mother*.

To my beloved *friends* for their continuous **support** and **standing** *by my side through the thesis.*

Rasha.

2022 .

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Abstract

Background: There is a high rate of anemia in underdeveloped countries, which leads to increased maternal and neonatal morbidity and mortality. All pregnant women are at risk of developing anemia. Thus, the study's objective is to evaluate pregnant women's Awareness, their health beliefs about their relationship to preventive behavior.

Methods: A descriptive, correlational study was conducted on a sample of 250 pregnant women at the Obstetrics and Gynecology Teaching Hospital in the city of Kerbela for the period from 25th Feb to 5th April. The credibility of the questionnaire was investigated through submitted to experts to prove its reliability and validity. Data were collected using interview techniques and analyzed by applying descriptive and inferential statistical data analysis approach.

Results: According to the findings, most pregnant women (40.8% had a moderate degree of awareness, 41.6% had moderate health beliefs, and 56.4% had inadequate preventive behavior). Pregnant women are more likely to take measures to prevent anemia if they are aware of the condition r = 0.370; p = 0.00" and have health-related thoughts about anemia r = 0.279; p = 0.00. There was a substation relation among protective behavior and the age of marriage "p = 0.001", maternal education "p = 0.001", maternal income "p = 0.002", and maternal information sources "p = 0.010".

Conclusions and Recommendations: The preventive behavior of anemia in pregnant women depends on their awareness and health beliefs. A decrease in the prevalence of anemia occurs due to women's health awareness and ideas. Therefore, pregnant women need to intervene in health awareness programs via social media to improve their preventive behavior.

Table of Contents

List of Tables

List of Figures.

List of Appendices.

List of Abbreviations

No	Abbreviation	Meaning
1.	AIDS	Acquired Immunodeficiency Syndrome.
2.	AIP	Anemia In Pregnancy.
3.	CBC	Complete Blood Count.
4.	CED	Chronic Energy Deficiency.
5.	D.f	Degree of Freedom.
6.	HB	Hemoglobin.
7.	HBM	Health Belief Model.
8.	HIV	Human Immunodeficiency Virus.
9.	WHO	World Health Organization.
10.	IDA	Iron Deficiency Anemia.
11.	F	Frequency.
12.	IFA	Iron Folic Acid.
13.	IFAS	Iron Folic Acid Supplements.
14.	LBW	Low Birth Weight.
15.	MCV	Mean Corpuscular Volume.
16.	MCH	Mean Corpuscular Hemoglobin Concentration.
17.	M.s	Mean of score.
18.	No	Number.
19.	P	Page.
20.	p.p	Pages.
21.	P-value	Probability value.
22.	RBC	Iron Binding Capacity.
23.	SCD	Sickle Cell Anemia.

24.	S.D	Standard Deviation.
25.	SPSS-XX	Statistical Package of Social Sciences 20.
26.	TIBC	Total Iron Binding Capacity.

List of Symbols

No	Symbol	Meaning
1.	&	And
2.	=	Equal to
3.	<	Less than
4.	±	Minus/plus
5.	≥	More than or
6.	%	Percentage
7.	Σ	Sum

Chapter One

Introduction

Chapter One

1.1. Introduction

Pregnancy is an important moment in a woman's life (Stephenson et al., 2018). The effects of anemia in pregnancy (AIP) are widespread and costly (Manickavasagam, 2021). The results of pregnancy are significantly influenced by diet and micro nutrition. Over 50% of pregnant women worldwide have iron deficiency during pregnancy (WHO, 2015).

Although anemia is a condition that may affect anybody at any time, it is especially prevalent among pregnant women owing to the changes in their bodies (Delil et al., 2018). Anemia is diagnosed in pregnant women when the hemoglobin content in their blood falls below 11 g/dl, limiting the amount of oxygen that can be carried by their blood to the tissues throughout their bodies (Lebso et al., 2017).

When it comes to the health of both the mother and the growing child, the importance of maintaining a normal Hb level throughout pregnancy cannot be overstated. Inadequate amounts might be dangerous for both mother and child since it catalyzes tissue oxygenation (Li & Yang, 2017).

Because both the mother and the fetus need iron for the creation of blood during pregnancy, these women's needs for iron are higher than those of women who are not pregnant (Jouanne et al., 2021). Consuming 65 mg of ferrous iron daily has been demonstrated to reduce the risk of premature delivery and low birth weight (Domellöf, 2017).

Anemia in pregnancy was defined by the World Health Organization (WHO) as a decrease in hemoglobin (Hb) from 11.0 g/dL in the first trimester to 10.5 g/dL in the second trimester (Cetin et al., 2019). Anemia in pregnancy can range from mild (Hb 10.0–10.9 g/dL) to severe (Hb 7.0–9.9 g/dL) or even life-threatening "Hb 7.0 g/dL or below" (Patil, 2016).

If all the body's iron stores are used up and the body is not able to acquire enough iron from food, the body will make fewer red blood cells RBCs and they will contain less hemoglobin than they should. Iron deficiency anemia is the most frequent kind of anemia and the most prevalent dietary deficit in the globe (Khani Jeihooni et al., 2021).

It affects more than 700 million people, making it the most widespread dietary issue in the world today (Kumari et al., 2016). When the body cannot absorb enough iron to meet its needs, an iron shortage results (Pasricha et al., 2021). This deficiency could be brought on by insufficient iron intake, decreased dietary iron bioavailability, increased iron requirements, and chronic blood loss (Cappellini et al., 2020).

Signs and symptoms of iron deficiency anemia include exhaustion, unease, poor appetite, apathy/depression, responsiveness to cold, lack of strength, anxiety, drowsiness, headache, ringing in the ears, a shortness of breath, irregular heartbeats, difficulty breathing, muscle rigidity and endurance, and a reduced capacity to perform daily living tasks (Breymann, 2015).

An iron deficiency can be identified with the use of a complete blood count (CBC) can reveal the extent of anemia (Subramaniam & Girish, 2015). In chronic iron deficiency anemia, both the mean corpuscular volume (MCV) and the mean corpuscular hemoglobin concentration (MCHC) are below the normal range for the laboratory performing the test. total binding capacity, serum ferritin, and serum ferritin (Kelkitli et al., 2016).

A normal serum ferritin level can be detected in people who are iron deficient but also have other conditions "such as hepatitis or anemia of chronic disorders," whereas a low serum ferritin level is essentially diagnostic of iron deficit. It is possible to distinguish iron deficiency anemia

from other types of microcytic anemia with the use of these test findings (Auerbach & Adamson, 2016).

Primary treatment for iron deficiency anemia IDA consists of oral iron supplements since they are effective as a first-line therapy. The most widely used formulations are ferrous fumarate and ferrous gluconate, and gastrointestinal disorders are the predominant side effects (Koduru & Abraham, 2016). It is recommended to take the medication on an empty stomach, and treatment should last for at least three months (Tandon et al., 2018).

In industrialized, emerging, and impoverished nations, anemia in pregnancy is more common. Due to its poor income and difficulty in affording health care, the latter is negatively impacted (Petry et al., 2016; Ritchie et al., 2016). Due to the negative effects of anemia, women are more susceptible, especially pregnant women (Mirza et al., 2018).

Anemia during pregnancy is most commonly caused by iron deficiency, which accounts for around half of all cases globally. Further, it is estimated that 38% of pregnant women in developed countries suffer from iron deficiency (Serbesa & Iffa, 2019).

Anemia during pregnancy is common in poorer countries due to poor nutrition, parasite infestation, human immunodeficiency virus HIV infection, excessive bleeding, and other chronic medical disorders such renal and hepatic illnesses (Maradze et al., 2020).

Pregnancy difficulties that put the lives of both the mother and the fetus in danger can emerge from anemia during pregnancy, which is frequently linked to poor pregnancy outcomes (Suryanarayana et al., 2017).

The prevalence of anemia is influenced by a number of variables, such as awareness of the condition and its consequences, treatment cost,

adherence to anemia prophylaxis, socioeconomic and demographic characteristics, dietary habits, etc. (Kalaivani & Ramachandran, 2018).

1.2. Importance of Study

Consequences for the health of future generations, societal progress, and the economy are all negatively impacted when pregnant women suffer from anemia. Pregnant women who are anemic, especially those with severe anemia, are more likely to be inactive, to have a lower ability to cope with bleeding before and after childbirth, and to have a higher risk of maternal morbidity and death (Abdulwahid & Ahmed, 2017).

Pregnant mothers and their babies are also negatively impacted by perinatal mortality, fetal anemia, low birth weight (LBW), preterm delivery, intrauterine growth restriction, and LBW (Gedefaw et al., 2015).

Anemia during pregnancy is one of the major causes of maternal mortality and contributed to 22,000 maternal fatalities, making it one of the key measures of the quality of health services in a nation (Nivedita, 2016).

Though frequent iron supplementation and intermittent preventative treatment for malaria with anti-malarial drugs are part of public health strategy, maternal anemia remains a leading cause of morbidity and death. So, we looked at how much expectant mothers knew about how to avoid anemia and whether or not they were doing anything about it (Saito et al., 2020).

All pregnant women now have access to free iron supplements; yet, the pregnant woman's lack of understanding about anemia and supplements may act as a significant barrier to or driver of this behavior. Health care professionals' inadequate communication, doubts about the effectiveness and necessity, concerns about side effects, and a lack of supply have all been identified as impediments to iron intake compliance (Malek et al., 2018).

Given the prevalence of anemia in this population, this study aimed to assess pregnant women's awareness of the issue and their beliefs about taking behavior to prevent anemia. Pregnant women have benefited from education and interventions based on this approach because they are more aware of the benefits of healthy eating habits and have fearing that their unborn child would have difficulties due to anemia. As an added, they have been successful in disseminating health information and improve health beliefs on preventing behavior toward anemia, leading to better results for both mother and child throughout pregnancy (Salama, A. M. 2018).

Women's education alone won't result in any good changes, but raising the family's level of education will definitely aid in resolving this issue. Both the husbands' and the wives' educational backgrounds play a significant role in how the couple receptive to the advice of the medical professionals (Lokare et al., 2012). Therefore, antenatal clinics should provide nutritional education and dietary counseling in order to combat the problem of anemia in pregnancy (Sinha, 2021).

Despite the fact that women usually identify anemia's symptoms, they are unaware of its medical name. Due to lack of understanding and lack of preventative activity, half of women worldwide do not view these symptoms as a priority health concern that demands attention (Maria Domenica Cappellini et al., 2017). Women who seek out prenatal care are frequently familiar with iron supplements, but frequently do not understand why they are recommended (Birhanu et al., 2018).

Therefore, it is important to inform pregnant women about anemia so that the government's free supplements program can benefit everyone, especially those in the lowest social classes (Sinha, 2021). Anemia affects women's energy levels and productivity at work, which may jeopardize household food security and income (Unicef & WHO, 2017). Secondly,

intrauterine growth retardation, stillbirth, low birth weight, and neonatal death can all occur as a result of severe anemia during pregnancy (Bangal et al., 2016).

Because it increases the risk of preterm birth, perinatal mortality, and death during childbirth and the postpartum period, anemia is a critical factor in the poor pregnancy and birth outcomes in underdeveloped nations (Chen et al., 2018). Nutritional behavior will improve as a result of health education for expectant women that emphasizes the perceived benefits of optimal diet (Khoramabadi et al., 2016).

Depending on the culture and understanding of women, eating iron-rich foods when preparing food at home and maintaining good awareness are two ways to prevent iron deficiency. While low birth weight, newborn neonatal deaths, and preterm in women with severe iron shortage are all linked to lower maternal education (Tashara, 2015). One of the most crucial protective aspects in obtaining optimum health for women is maintaining her health through healthy behavior, which is exemplified by consuming nutritious foods (Dunneram & Jeewon, 2015).

1.4. Statement of the Problem

Anemia in pregnancy is serious health problem in undervaluing countries, it is can lead to high rate of morbidity and even death (Al Sattam et al., 2018). Anemia affects (38.5%) of pregnant women (Lattof et al., 2020). According to Iraqi research and the last report of the World Bank estimates (38%) of pregnant women had anemia (Hussein et al., 2020, AL Abed et al., 2020). anemia can lead to health problems such as low birth Wight, early labor, restriction growth of fetus inside the uterus intra uterine growth restriction (IUGR) and increase mortality for both mother and fetus (Hamodi et al. 2022)

. If pregnant women believe that they are at risk of anemia disease and understanding it is has serious consequences can effect on their health this will lead them to change behavior and adopting healthy procedures toward prevention of anemia (Andani et al., 2021, Dilard, 2017). Therefore, this study conducted to assess the relationship between awareness and health beliefs with prevention behavior of pregnant women toward anemia.

1.5. Objectives of the Study

1. To assess the awareness and health beliefs towards anemia among pregnant women.
2. To assess the pregnant women's preventive behavior of anemia.
3. To determine the association between awareness and health beliefs towards anemia with regard prevention behavior of anemia.
4. Find out the differences in prevention behavior of anemia with regard pregnant socio-demographic characteristics.

1.6. Hypotheses

It is hypothesized that the result may reveal:

H_1: There were significant positive relationship between awareness and health beliefs with anemia prevention behavior.

H_0: There were significant negative relationship between awareness and health beliefs with anemia prevention behavior.

1.7. Definitions of Terms.
1.7.1. Anemia

a. Theoretical

Is a situation in which there aren't enough red blood cells RBC or that they can't carry enough oxygen to meet physiologic demands, which depend

on factors like age, gender, attitude, smoking, and whether or pregnant status (Duko et al., 2017).

b. Operational

Is a common condition during pregnancy characterized by fewer red blood cells or less hemoglobin than normal, which lead to reduces the blood's ability to carry sufficiency oxygen to the tissues of the pregnant women body which may exposed her health and her fetus health to many risks .

1.7.2. Awareness

a. Theoretical

Existence of something, or current comprehension of a situation or topic based on knowledge or experience (Endsley, 2021).

b. Operational

Understanding and observational skills are related to anemia.

1.7.3. Health Beliefs.

a. Theoretical

Are what people think constitutes their health, what they believe the reason of their disease is, and how to recover from an ailment (Kelly & Barker, 2016).

b. Operational

Refers to pregnant women's perceptions of anemia's risk, severity, benefits, obstacles, and level of self-efficacy.

1.7.4. Prevention Behavior

a. Theoretical

Activity carried out by a person who considers themselves to be healthy in order to prevent disease (Edelman & Kudzma, 2021).

b. Operational

Consists of measures taken for anemia prevention.

Chapter Two

Review of Related Literatures

Chapter Two

2.1. Anemia: An Overview

To put it simply, anemia is a condition with too few red blood cells in the body (Bhadra & Deb, 2020). Anemia is one of the most common illnesses, affecting over 800 million women and children globally, with the largest prevalence (62.3%) found in Africa (Zeye, 2019). For anemia to develop, either the body's ability to produce new red blood cells (RBCs) is diminished, more RBCs are being destroyed than are being formed, or there has been a substantial loss of blood(Lam et al., 2021).

RBC production or destruction irregularities could result from a variety of causes. Infections, diet, and physiological requirements are the main causes of this "Chaparro & Suchdev, 2019". All living beings require nutrition for a variety of physiological processes. Pregnant women, because of the needs of the developing baby, have greater nutritional needs than do no pregnant women (Das et al., 2017). In pregnant women, the baby benefits from the mother's diet just as much as she does (Nnam, 2015).

Anemia during pregnancy is a frequent medical condition that can have harmful implications on both the mother and the fetus (Adam & Ali, 2016). Additionally, the developing fetus consumes the mother's red blood cells for growth and development, leaving less for the mother (Sebastiani et al., 2019). An increased risk of maternal morbidity and death is one of the effects of anemia in pregnant women (Harrison et al., 2021). Additionally, having a baby with maternal anemia increases the risk of low birth weight, early birth, and perinatal and neonatal mortality (Chu et al., 2020).

Anemia is an indication of both subpar health and diet (Bhandari et al., 2016). One of the most serious health consequences of anemia is a rise in the risk of maternal and infant mortality in cases of severe anemia (Dulipala & Gujjarlapudi, 2016). One major cause for alarm is the impact anemia has on children's brain and body development, as well as on physical performance (particularly adult work productivity).(Marcus et al., 2021).

Anemia during pregnancy is caused by nutritional deficits of iron, folate, and vitamin B12 as well as parasite illnesses including malaria and hookworm in developing nations (Chaparro & Suchdev, 2019). Depending on the region, the time of year, and dietary habits, each of these elements contributes to anemia differently (Getahun et al., 2017).

Anemia manifests itself in a variety of ways, some of which are dizziness, fatigue, headaches, chills, and shortness of breath, heart palpitations, and a pale skin (Soundarya & Suganthi, 2017). In addition to these effects, anemia can have far more serious ones, such as a decrease in birth weight, an increase in maternal and newborn mortality, a drop in adult productivity, and a slowing of physical and cognitive development in children and babies. (Roba, 2016).

2.2. Epidemiology of Anemia

Both developing and developed countries are affected by the public health problem of anemia, which has far-reaching consequences for people's physical and economic well-being. The incidence is highest in young infants and pregnant women, but it can occur at any age (Soliman et al., 2017). Pregnant women are more vulnerable to dietary problems such chronic energy deficit (CED) and anemia. Anemia affects 56 percent of

pregnant women in low-income countries, reports the World Health Organization. (Lestari et al., 2018).

More than 1.5 billion people (95%), or 24.8% of the global population, have anemia. Incidence is highest among children under the age of six "47.4%, 95%" and lowest among males "12.7%, 95%". According to (Hussien & Ali, 2018). Yet the demographic group that is hit the worst is that of women who are not pregnant "468.4 million, or 95%". (Niroula, 2018). The World Health Organization's (WHO) regional estimations suggest that, among pregnant and no pregnant women, Africa has the greatest prevalence rate "47.5-67.6%" and that South East Asia has the largest absolute number of victims "315 million" (Krishnan et al., 2021).

Approximately 800 million girls and boys, according to the World Health Organization's (2015) estimation, are anemic. The prevalence of anemia was highest in children, then in expecting mothers (Mehrotra et al., 2018). The lowest rates of anemia were seen in the groups considered among women of childbearing age who were not pregnant. Taking into consideration pregnancy, the average pregnant woman's hemoglobin level is over the threshold for moderate anemia, at 12.6 g/dl (Herzog et al., 2019). It is more common in underdeveloped nations "43% and 56%, respectively" than in developed ones "9% and 18%, respectively" for pregnant women to be anemic. (Azhar et al., 2021).

However, there were variations in and within-region Hb levels. Children with severe anemia were most common across the African continent (Opoka et al., 2017). The lowest Hb levels and highest anemia incidence were found in the African region, which is not surprising given the region's higher prevalence of inherited diseases, malaria, and other variables that might cause anemia (Chaparro & Suchdev, 2019). Due to an

iron shortage, two billion people worldwide are anemic (Mantadakis et al., 2020).

Young people frequently experience anemia, which is mostly brought on by an iron deficiency. It should be remembered that one of the most rapidly expanding phases of human growth is adolescence (Bhadra & Deb, 2020). Many bodily changes occur during this time as a result of hormone release in both boys and girls. Puberty brings about significant and dramatic changes. Most people with anemia are women who are close to having children, infants, and teenage girls (Alsaker & Flammer, 2020).

The World Health Organization (WHO) estimated that 32 million pregnant women worldwide had anemia in 2011; this figure rose to 38% in 2015. (Daru et al., 2017). According to the WHO research, iron deficiency causes anemia in poor nations in which "52% of pregnant women and 35 to 40% of healthy women are anemic". Anemia affects over 43% of children under the age of five, 27% of adolescents in underdeveloped nations, and 6% of people in industrialized countries (Akbari et al., 2017).

Iron-deficiency anemia affected 64% of children in south Egypt, according to the prevalence of anemia study (Yamamah et al., 2015). Anemia affected 46.6% of 10- to 19-year-olds, with 28.8% of females having the condition Severity of. Mild anemia affects around 98.3% of women, whereas moderate anemia affects roughly 11.5% of women. No severe anemia symptoms were seen. (Prasanth, 2017). Even though frequency varies greatly between environments and accurate data are sometimes lacking, a shockingly high percentage of women of childbearing age, and particularly pregnant women, are anemic in locations with low resources. Geographically, individuals residing in Asia and Africa are more at danger (Ayano & Amentie, 2018).

According to the most recent World Bank Group report, anemia affects nearly 38% of pregnant women in Iraq (Jawad & Ghazal, 2021). Based on data from Iraqi surveys on the prevalence of anemia conducted in 2008 and 2012, the country still has a mild to moderate prevalence of anemia in various age groups, as indicated in table 2-1.

Table 2-1: Iraq estimates of anemia prevalence in individuals affected (Hussien & Ali, 2018).

Population group	Proportion of the population with anemia (%)	Public health problem
Pregnant women	37.9	Moderate
Lactating women	25.8	Moderate
Non-pregnant women of reproductive age (15-49 Years)	19.9	Mild

2.3. Anemia in Pregnancy

Due to the fact that the pregnant lady and her developing fetus will require the nutrients they consume, pregnant women are more susceptible to anemia (Morrison et al., 2021). Additionally, the fetus and she both benefit from her red blood cells. It is necessary for the development and growth of the fetus (Cirillo & Cohn, 2015). Due to these, a pregnant woman is more likely to develop anemia than usual (Ayano & Amentie, 2018).

In addition to dietary habits and the pregnant woman's physiological state, external variables, such as infectious diseases, "especially malaria and helminthiasis," may determine whether or not the mother develops anemia. (Mireku et al., 2015). Pregnant women's anemia status can also be affected by less obvious variables such hereditary disorders and socioeconomic position (Tata et al., 2019). Hemoglobin levels below "11.0 g/dl" are considered anemia "(Obai et al., 2016)".

Poverty is associated with an increased likelihood of pregnant women having iron deficiencies (Mawani et al., 2016). Anemia during

pregnancy has a wide range of prevalence depending on a woman's location, socioeconomic status, food, lifestyle, and access to prenatal care. (Imran et al., 2019). Pregnancy anemia is more common among women who are poor, malnourished, living in unsanitary surroundings, uneducated, unemployed, without access to health care, and unaware of the benefits of antenatal care (Azhar et al., 2021).

Most people suffer from either iron deficiency anemia or megaloblastic anemia, both of which are caused by a lack of folic acid. Anemia is more common in women who have a poor diet or who do not take prenatal iron and folate supplements. Other, less common causes of acquired anemia during pregnancy include hemolytic anemia and aplastic anemia. Furthermore, thalassemia and sickle cell anemia can induce anemia, which can negatively impact both the mother and the developing child. (Bekele et al., 2016).

True or absolute anemia typically results from nutritional deficiencies. Infections, malnutrition, and hereditary disorders like hemoglobinopathies can all exacerbate the clinical picture and cause further complications. (Tadesse et al., 2017).

2.4. Causes of anemia in pregnancy:

Five basic causes may be identified for anemia during pregnancy. These include genetic, dietary, and infectious variables.

2.4.1. Food-related anemia

This results from a lack of any of the nutrients necessary to keep hemoglobin levels at a normal level (Godswill et al., 2020). Regardless of the underlying causes, nutritional anemia is a disease where the blood's hemoglobin concentration is lower than usual due to a lack of one or more essential nutrients (Benson et al., 2021). The most common kind of anemia

worldwide is nutritional anemia, which is mostly brought on by a lack of iron, folate, and vitamin B12. These make up more than 75% of all anemias associated with pregnancy.(Breymann, 2015).

The most common kind of anemia in the world is nutritional anemia, which is mostly brought on by iron, folic acid, vitamin B12, and vitamin C deficiency. (Bhadra & Deb, 2020). Around the world, half of anemia's burden is caused by iron deficiency. 1.3 to 2.2 billion people suffer from iron deficiency, of which 50% are women of reproductive age (Abdulwahid & Ahmed, 2017).

Most of these women, particularly those in impoverished countries, begin pregnancy with low iron stores as a result of the need to replenish iron lost during menstruation, which makes up approximately half of a woman's daily iron need. (Mawani et al., 2016). The high demand for the synthesis of maternal tissue and its transfer to the fetus makes their iron deficit worse. (Ho et al., 2016).

The lower bioavailability of iron during pregnancy is unavoidable due to the fetus' greater requirement for iron during pregnancy compared to the 45% more blood generated in the non-pregnant state, which is necessary for the fetus' oxygen and nutritional demands and is provided through the placenta (Farias et al., 2020). Low levels of hemoglobin and hematocrit, as well as a drop in serum iron level and transferrin saturation, which show that iron reserves have been depleted, are signs of serious types of anemia brought on by iron deficiency. (Breymann, 2015).

Anemia in pregnancy can be prevented and treated with the help of vitamins C, A, iron, and folic acid. Any of these will have negative health effects if consumed insufficiently or not at all, and these effects could have a lasting negative impact on health (Mousa et al., 2019). It could be more

challenging for vegan or vegetarian expecting mothers to gain all the nutrition they need to combat anemia from plant-based diets alone without taking extra supplements. (Sebastiani et al., 2019).

It is believed that maternal dietary inadequacies of nutrition during early pregnancy have a significant impact on the growth of the fetus. Maternal nutrition plays a key function in the development of the fetus (Nnam, 2015). "Red meat, snails, fish, eggs, and green vegetables" are all sources of iron in the diet, and how much of it is absorbed relies greatly on the body's iron balance (Anlaakuu, 2015). Excessive tea or coffee consumption after meals was found to be a predictor of anemia in women of reproductive age (Jamnok et al., 2020).

Nutritional anemia is not a common problem among people in prosperous nations. Many people in these countries continue to worry about it, and it is unquestionably a severe health problem in developing, underdeveloped countries. (Hammo & Abdullah, 2019).

2.4.1.1.Iron

Despite the fact that iron is abundant in nature, organisms typically have variable degrees of iron shortage (Cappellini et al., 2020). This is due to the fact that iron primarily exists in forms that are difficult for living things to readily absorb. The adaptations made by people and other living things to this are numerous (Miller, 2017). containing elements that may either convert iron into a form that is easily absorbed by an organism or trap iron in different ways (Yiannikourides & Latunde-Dada, 2019).

Due to iron's significance, it is crucial that individuals consume iron in their diets. During the first few months of life, a baby's demands for iron are typically met by the iron in breast milk (Friel et al., 2018). By the time the baby is four to six months old, their needs for iron grow. Once

more, following the first year of life and especially during adolescence's development spurts, the body requires more iron (Zeye, 2019).

The most crucial vitamin for treating anemia, particularly pregnancy-related anemia, is iron. This is due to the fact that iron deficiency anemia, which accounts for nearly 50% of all anemia cases worldwide, is the most prevalent kind of anemia (Camaschella, 2017). Another study revealed that 75% of all cases of anemia in pregnancy are caused by iron deficiency (Di Renzo et al., 2015). Hemoglobin, which is essential for red blood cells to deliver oxygen throughout the body, is produced by red blood cells and requires iron as a crucial component. An chronic iron imbalance leads to anemia owing to iron deficiency. (Bhadra & Deb, 2020).

Usually, a negative iron balance is the first sign, which leads to the depletion of iron stores and the development of red blood cells lacking in iron (Georgieff, 2020). Usually, a negative iron balance is the first sign, which leads to the depletion of iron stores and the development of red blood cells lacking in iron (Zamora et al., 2016). Determine if anemia is actually brought on by iron deficiency or another chronic illness by examining whether iron storage (serum ferritin and hemosiderin) are below normal values. (Gkamprela et al., 2017).

Serum ferritin levels below 15 g/l indicate iron deficiency in adults with anemia, especially in those over the age of 5. Iron deficiency is quite likely but not definitive when serum ferritin levels are between 15 and 30 g/l (Zeye, 2019). However, in conditions of infections and inflammations, the diagnosis of iron shortage made using serum ferritin levels can be incorrect (Muriuki et al., 2020).

2.4.1.2.Vitamin A

When it comes to anemia, particularly during pregnancy, vitamin A is extremely crucial (Bailey et al., 2015). Red blood cell formation and iron metabolism are both aided by it. It is also very significant since cell differentiation and development depend on it, particularly during the period when the fetus needs to grow and develop (Bhadra & Deb, 2020). However, too much of it won't have any detrimental effects. Additionally, deficiency illnesses like night blindness can be caused by having too little of it (Bastos Maia et al., 2019).

Anemia can be brought on by a vitamin A deficit because of the part vitamin A plays in erythropoiesis (Musallam & Taher, 2018). Iron supplementation alone is less effective than iron supplementation combined with vitamin A in treating anemia in pregnant women. Anemia cannot be fought with just vitamin A. (Sabina et al., 2015).

2.4.1.3.Folic Acid (folate) and Cobalamin (B12)

The vitamins B12 and folic acid are necessary for the formation of red blood cells. Even before a woman becomes pregnant, or as soon as she does, folic acid should be taken (Merrell & McMurry, 2020). Vitamin B12 increases the absorption of folic acid in addition to assisting in the synthesis of red blood cells (Maqbool et al., 2017). These aid the body's capacity to keep the blood's amount of red blood cells at a healthy level, preventing anemia. (Hennek et al., 2016).

Anemia, including pernicious anemia, can arise from a vitamin B12 deficiency (Sun et al., 2016). Due to the fact that vitamin B12 is normally obtained primarily from animal sources, pregnant vegan women are most likely at risk for developing this type of anemia (Agnoli et al., 2017). It is

advised that vegan women who are expecting use fortified meals like cereal to satisfy their vitamin B12 needs. (Melina et al., 2016).

2.4.1.4. Vitamin C

The body's production of red blood cells, which vitamin C helps with, is the main treatment for anemia. Additionally, vitamin C helps the body absorb iron (He et al., 2018). Iron absorption is more effective when vitamin C is present. Pregnant women are encouraged to eat foods high in vitamin C or take vitamin C supplements to prevent anemia (Ngala, 2015).

However, using this nutrient improperly can cause preterm births. Additionally, vitamin C is strongly advised to be taken with meals for vegan expectant mothers who consume non-hem iron (Basrowi & Dilantika, 2021).

2.4.1.5. Calcium and Phosphorus

Calcium is necessary for the development of strong bones and teeth. Particularly for expectant mothers and their unborn children. But according to other research, a rise in blood calcium is associated with a decrease in the rate of iron absorption.(Almaghamsi et al., 2018).

According to Lynch SR's analysis of the epidemiological evidence, calcium salts in single human meals have such impact when both calcium and iron are present in the lumen of the small intestines at the same time. Exactly how this happens is a mystery.(Zeye, 2019).

However, a another research partially contradicts this, arguing that the transitory decrease in iron absorption rate that appears to occur with calcium consumption is not reflected in the markers used to determine anemia status when calcium intake is maintained over time (Richards, 2018).

There is also a negative correlation between blood phosphorus levels and dietary iron absorption, as shown by studies. This association was also found in a research limited to phosphorus-iron calcium complexes. (Zeye, 2019).

2.4.2."Geophagia (pica) as a Cause of Anemia in Pregnancy".

Geophagia is the term for eating soil or clay while pregnant. Anemia risk increased by more than double in relation to geophagia (Ohlan et al., 2021). Anemia is caused by the poor absorption of iron and other minerals caused by eating clay or soil. A study conducted in Sudan revealed that eating clay increased the incidence of maternal anemia (Anlaakuu, 2015).

Similar research from Kenya revealed that 56% of prenatal clinic attendees admitted to regularly consuming soil or clay (Narh et al., 2021). Despite the great prevalence of geophagia in developing countries and the possible influence on nutritional status and parasite infection, relatively little study has been conducted on the topic. (Mestawet Getachew et al., 2021).

2.4.3.Genetic Factors

Hemolysis of red blood cells occurs for a variety of reasons, and it is a key factor in the development of diseases including thalassemia and sickle cell anemia (Kato et al., 2017). Pregnancy complicates the treatment of sickle cell disease in women (Smith & Praetorius, 2015). There are more painful crises because of the haemodynamic changes that occur during pregnancy (Pinas-Carrillo & Chandraharan, 2017).

There are many ways that a crisis might affect a woman's pregnancy, including by causing multi-organ difficulties from the following vasoocclusion (Isah, 2020). There is an increased chance of

unfavorable pregnancy outcomes, including spontaneous miscarriages, intrauterine deaths, and stillbirths (Nazarpour et al., 2015). Pre-eclampsia and intrauterine growth restriction are two additional possible complications of sickle cell disease brought on by vasoocclusion thromboembolic events (Costa et al., 2015).

The probability of a woman developing a chest infection or urinary tract infection rises due to hyposplenism (Esegbona-Adeigbe, 2013). Additionally, there is a higher risk of preterm birth and caesarean delivery because of infection or maternal and fetal indicators (Gupta & Saini, 2018).

While each woman's potential physical reactions to sickle cell disease (SCD) during pregnancy will be unique, it is understood that these issues can raise maternal and fetal morbidity and mortality (Smith-Whitley, 2019). In addition to the medical implications of SCD on pregnancy, a woman with a chronic, lifelong illness must deal with the psychological and social strains that come with such a condition (Wilson, 2018).

2.4.4. "Infections"

(a) "Worm infestation"; Worm infestation during pregnancy can cause severe anemia (Salam et al., 2015). Hookworms can cause severe anemia in pregnant women by invading a mucosal region in the small intestine and feeding on the blood and nutrients there. (Anlaakuu, 2015). According to estimates, a worm load of 60 to 120 will generate mild anemia, while a load of more than 300 worms will result in severe anemia (Bello-Manga et al., 2016).

The main way parasitic worms, in particular hookworms, because chronic blood loss is by secreting anticlotting factors, which make sure they have an ongoing supply of blood from the host (Bukhari et al., 2020).

Many women neglect their food and personal hygiene while they are pregnant (Konuk, 2018).

Infections caused by soil-transmitted helminthes, of which there are many types, are more common in pregnant women due to eating disorders like pica, which are triggered by hormonal and nutritional abnormalities. (Zeye, 2019).

Preventive chemotherapy is advised by the WHO for expectant mothers in areas where the incidence of helminthiasis is above 20% or if the prevalence of anemia in pregnancy is at least 40% (Mupfasoni et al., 2018).

(b) Malaria; Malaria is the most common parasite infection in areas where it is endemic (Silva et al., 2017). Anemia caused by malaria can range in severity from being life-threatening "less than 5 g/dl" to only slightly less than "11 g/dl". This is because pregnant women have less of a chance of fending against malaria. (Siagian, 2020).

Prim gravida women are more at risk for getting malaria during pregnancy and for the subsequent patterns of morbidity (Andrews et al., 2015). Since there are numerous etiologic variables causing anemia, it is expected that their relative contributions will differ by geographic region and season in particular (Chaparro & Suchdev, 2019).

The fact that individuals who regularly got malaria prophylaxis during pregnancy experienced significantly less severe anemia suggests that the condition may be linked to a long-term infection with Plasmodium falciparum malaria (White, 2018).

(c) "HIV/AIDS"; Fetal and maternal complications have been associated with anemia, a frequent clinical indication in HIV-positive women. (Tunkyi & Moodley, 2016). According to reports from Nigeria, anemia is

the most prevalent sign of HIV infection, affecting 30% of individuals with silent infections and 70% of people with AIDS. Therefore, it might be inferred that having HIV increases the risk of anemia in pregnancy (George & Paul, 2015).

Primary care providers should encourage voluntary counseling and testing of pregnant women for HIV to detect asymptomatic anemia in pregnancy caused by HIV infection (Eze et al., 2020). Female HIV carriers have a higher risk of anemia compared to female HIV negative carriers, according to research (Okoh et al., 2016). Therefore, there may be a correlation between anemia and maternal mortality among HIV-positive women who are pregnant. (Rahman et al., 2016).

2.4.5."Other Factors that Contribute to Anemia in Pregnancy"

2.4.5.1."Parity, Birth Interval and Age of the Woman".

Anemia can also be negatively impacted by multiple pregnancies, few children (short child spacing), and adolescent pregnancy (Dewi, 2015). The majority of women enter pregnancy with low iron stores, despite the fact that they need a significant iron store to replenish the iron lost during menstruation (Benson et al., 2021). As a result, when dealing with pregnancy conditions that are linked to high iron requirements for synthesis of maternal and fetal tissues as well as blood losses during delivery that worsen iron deficiency (Fisher & Nemeth, 2017).

Due to poor nutrition, growth-related demands, menstruation, and pregnancy, adolescent girls are more susceptible to anemia, which worsens their already precarious anemia condition (Pareek & Hafiz, 2015).

Parity; a study conducted in Nigeria found that multigravida women were more likely to experience anemia than prim gravida women. Anemia prevalence has been observed to decrease with increasing parity,

with 44.8% of prim gravida and 55.2% of multigravida demonstrating a strong correlation between anemia and parity. Contrarily, the prevalence of iron deficiency rose with parity, reaching 4% and 11.9% in prim gravida and multigravida, respectively (Okubatsion, 2015).

2.4.5.2.Socio-Cultural Beliefs

People's sociocultural beliefs might also have a negative impact on a pregnant woman's anemia. It is crucial to recognize that pregnant women exist and are members of communities with preexisting cultural norms and a variety of religious beliefs (Arzoaquoi et al., 2015). As a result, these socio-cultural beliefs influence how women perceive and comprehend various topics, such as pregnancy, health, and health care (Shishehgar et al., 2017).

Although it is commonly advised to take supplements of iron and folic acid, there are several economic, cultural, and societal barriers to this straightforward preventative treatment (Klemm et al., 2020). Claims that there has been gender inequality in the rural environment, with women typically receiving less attention than men (Yar'Zever & Said, 2013).

Lack of access to medical treatment is exacerbated by social, cultural, and economic factors such as gender inequality in food availability, the stress of employment, and special dietary needs like iron supplements (Ngoma, 2016). Because of this, many women, especially those living in rural regions, are stuck in a deteriorating health cycle that is exacerbated by having children and doing physically demanding work. (Pawar, 2019).

2.5. Maternal Effect of Anemia in Pregnancy:

Effects of severe anemia on both mother and child are detrimental. There is also evidence linking milder forms of anemia to worse birth

outcomes. (Di Renzo et al., 2015). Women with hemoglobin levels more than 6 gr/dl are less likely to experience severe maternal problems that are directly attributable to anemia (Hammo & Abdullah, 2019). However, even lower Hb levels in pregnant women may cause serious morbidity such infections, prolonged hospital admissions, and other general health issues (M D Cappellini et al., 2020).

There is a wide range of symptoms and signs that might accompany this clinical condition. The most common ones are clinical manifestations of glossitis and cheilitis including headaches, fatigue, lethargy, paresthesia, and so forth. In extreme situations, especially in pregnant women with hemoglobin levels below 6 gr/dl, high-output congestive heart failure and insufficient oxygenation of tissues, including heart muscle, may produce significant life-threatening consequences.(Tadesse et al., 2017).

Such disorders are unusual because of nutritional deficiency anemia, at least in industrialized countries or when the pregnant lady takes iron supplements. (Cantor et al., 2015). However, pregnancy difficulties including placenta previa or abruption placenta, surgical birth, and post-partum bleeding can cause severe iron deficiency anemia or hemorragic anemia. If these disorders are not addressed with blood transfusions or iron supplements, serious consequences may result (Eltaiyb & Hassan, 2018).

2.6. Complications of Anemia during Pregnancy:

Fatigue, forgetfulness, diminished mobility, and a lower quality of life are just a few of the many consequences caused by anemia (Iorember & Aviles, 2017). Additionally, it raises death rates by causing chronic illnesses including heart failure and kidney failure (Nuhu & Bhandari, 2018). Teenagers' cognitive abilities are negatively impacted by anemia

(Kapil et al., 2019). Additionally, a lack of iron results in cell cycle arrest and potentially cell death (Khan et al., 2020).

Iron metabolism may contribute to the prevalence of atherosclerotic disease and diabetes, as suggested by the work of (Ravingerová et al. 2020). This causal relationship is supported by anecdotal reports of enhanced glycemic management after a reduction in total body iron. There's evidence that it has a role in the development of vascular disease as well. Hematological, metabolic, and neurological disorders may be brought on by iron homeostasis dysregulation (Prasanth, 2017).

Anemia can also have a negative impact on pregnancy, even leading to the death of the mother, as well as have a negative impact on physical performance and work productivity (Sundararajan & Rabe, 2021).

2.7. Anemia Diagnoses:

A blood test for hemoglobin is typically used to determine the presence of anemia "mostly using complete blood counts". The World Health Organization recommends doing a full blood count to diagnose anemia during pregnancy (Naeem et al., 2020). It is advised that a hemoglobin meter be used to diagnose anemia during pregnancy rather than a hemoglobin color scale unless there is no other way to obtain one.(Zeye, 2019).

Hemoglobin, a protein found in red blood cells, transports oxygen to tissues and organs. Hemoglobin levels are often compared to normal values specified by the World Health Organization (Liu et al., 2018). These ranges change depending on variables including age, sex, physiological requirements like pregnancy and breastfeeding, altitude, and smoking status. Anemia is graded according to its degree of severity (Shubham et

al., 2020). Three levels of severity are distinguished. Pregnant women with hemoglobin levels of 7.0 g/dl have high anemia, 9.9 g/dl have moderate anemia, 10.9 g/dl have mild anemia, and 11.0 g/dl have high anemia (any anemia)(Arabyat et al., 2019).

Numerous factors that are not detected by the straightforward blood test for hemoglobin might result in anemia. It is believed that iron deficiency is the root cause of about 50% of anemia (Warner & Kamran, 2017). The medical examiner may conduct additional tests, such as ferritin tests and physical examinations, to identify the etiology of anemia (Cascio & DeLoughery, 2017).

2.8. Classification of Anemia:

Anemia is classified into:

1- **Microcytic& Hypochromic anemia:** In cases of lead poisoning, sideroblastic anemia, thalassemia, iron deficiency anemia, and anemia of chronic disease (in some situations), the mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH) are less than 80 FL and 27 pg., respectively (some cases).

2-**Normocytic & Normochromic anemia:** MCV 80-95 FL MCH 27 pg., which can be seen in bone marrow failure, chronic disease-related anemia, acute blood loss, renal disease, mixed deficiencies, and hemolytic anemia (e.g. post chemotherapy, infiltration by carcinoma, etc.).

3- **Macrocytic anemia MCV> 95fL occur in megaloblastic:** non megaloblastic vitamin B12 of folate deficiency: alcohol, liver illness, myelodysplasia, aplastic anemia, etc. (Naphade, 2016).

2.9. Factors Associated with Anemia in pregnancy:

There are various reasons that can cause anemia in pregnant women. Anemia in pregnant women is caused by the interaction of several factors, including sociodemographic, economic, dietary, and health-related issues for women. For the diagnosis and control of anemia in pregnancy, local knowledge of the severity and associated risk factors is crucial (Gebre & Mulugeta, 2015).

Because of cultural variations in, for instance, socioeconomic conditions, lifestyles, and health-seeking practices, its frequency in pregnancy varies greatly (Chowdhury et al., 2015). Numerous factors, including low socioeconomic status, high parity, frequent pregnancies, an inadequate diet in terms of both quantity and quality, a lack of knowledge of health and nutrition, and a high prevalence of infectious diseases and parasitic infestations are known to be associated with anemia (Seema, 2017). Poor people frequently lack access to medical care and preventive measures in developing nations, which raises their risk of anemia and contributes to high maternal mortality rates (Cappellini et al., 2020).

2.10. Pregnant Women Awareness Related to Anemia:

In a more general and straightforward definition, awareness can be described as knowledge or perception of a situation or reality. It also refers to "the condition or level of consciousness where sensory data can be confirmed by observation (Duko et al., 2017).

In general, women are willing to acquire and accept information to assist improve their and their families' health conditions because they are the primary health providers in the family (Lupton & Maslen, 2019). Because every pregnant woman faces risk during pregnancy, even those with low risk pregnancies, health education and preventive measures are

essential for the health of both the mother and her unborn child (Jevtić et al., 2015).

As a result, it's crucial to increase awareness among all women, especially those who are reproductive age, through effective and well-planned health education and promotion efforts that concentrate on the biggest health issues (Dunneram & Jeewon, 2015).

The most prevalent type of anemia is iron deficiency anemia, which is managed by eating foods high in iron and taking iron folic supplements (Paganini & Zimmermann, 2017). However, women are less mindful of their health than men are (Perkins et al., 2019). Knowledge serves as a catalyst for action (Markowska, 2018). It is thought that raising awareness encourages behavior change, and it's probable that a lack of information of anemia prevents people from using IF supplements, following healthy dietary guidelines, and using anti-helminths medications (Duko et al., 2017).

Health promotion, which is the act of enabling individuals to improve their health through the provision of information, health education, and skill training, is therefore one of the most efficient measures to minimize the occurrence of anemia during pregnancy (Khoramabadi et al., 2016). Controlling anemia requires identifying gaps and raising awareness. Women of childbearing age in general and pregnant women in particular should be made aware of the effects of anemia during pregnancy (Mawani et al., 2016).

The main obstacles to current attempts to avoid anemia during pregnancy are unfavorable sociodemographic characteristics (Hans et al., 2015). Only educating women will not result in any desired changes, but

raising the family's level of literacy will undoubtedly assist in resolving this issue (Sperling & Winthrop, 2015).

How receptive a couple is to medical advice is strongly influenced by the level of education both the husband and the wife possess. (Wulifan et al., 2015). Therefore, antenatal clinics should provide nutritional education and dietary counseling in order to combat the problem of anemia in pregnancy with a missionary zeal, novel approach, and evidence-based interventions (Misra et al., 2016).

Despite the fact that women usually identify anemia's symptoms, they are unaware of its medical name. In every country, half of women believe that these symptoms are a top health problem that needs to be addressed, while the other half do not (Mansour et al., 2021). Women who seek out prenatal care are frequently familiar with iron supplements, but frequently do not understand why they are recommended (Birhanu et al., 2018).

2.11. Pregnant Women Health Beliefs Related to Anemia:

One of the main models for teaching preventative behaviors is the health belief model (HBM). HBM can be used to create and implement educational interventions for disease prevention (Orji et al., 2012). One of the most well-known frameworks that emphasizes the crucial role of people's beliefs as a stimulant for behavior change implementation is the health-based model (HBM) (Khoramabadi et al., 2016).

Individuals are more likely to be engaged in risk-reduction methods when they have a clearer understanding of the dangers posed by an unhealthy habit, of how vulnerable they are to the unfavorable impacts of their emotions, and of the ways in which their actions contribute to those effects (Pepper & Nettle, 2017). They are able to attenuate these negative

impacts, as well as improve their attitudes and a wider range of good behaviors, by applying learning strategies to oppose and eliminate current barriers. "The model consists of a performance guide, perceived susceptibility, perceived severity, perceived rewards, and perceived barriers" (Gilmore, 2011).

People will engage in risk-avoidant behavior if they believe they are talented and sensitive to special behavior (perceived sensitivity), if they believe that a variety of actions and measures can lessen the negative effects and hazards of special behavior (perceived benefits), and if the benefits of engaging in these actions and measures outweigh the costs associated with engaging in these special behaviors (perceived barriers). When such stimuli are present, they can serve as cues to action and guides, making the person feel equipped to get beyond the obstacles (self-efficacy) (Ghaderi et al., 2017).
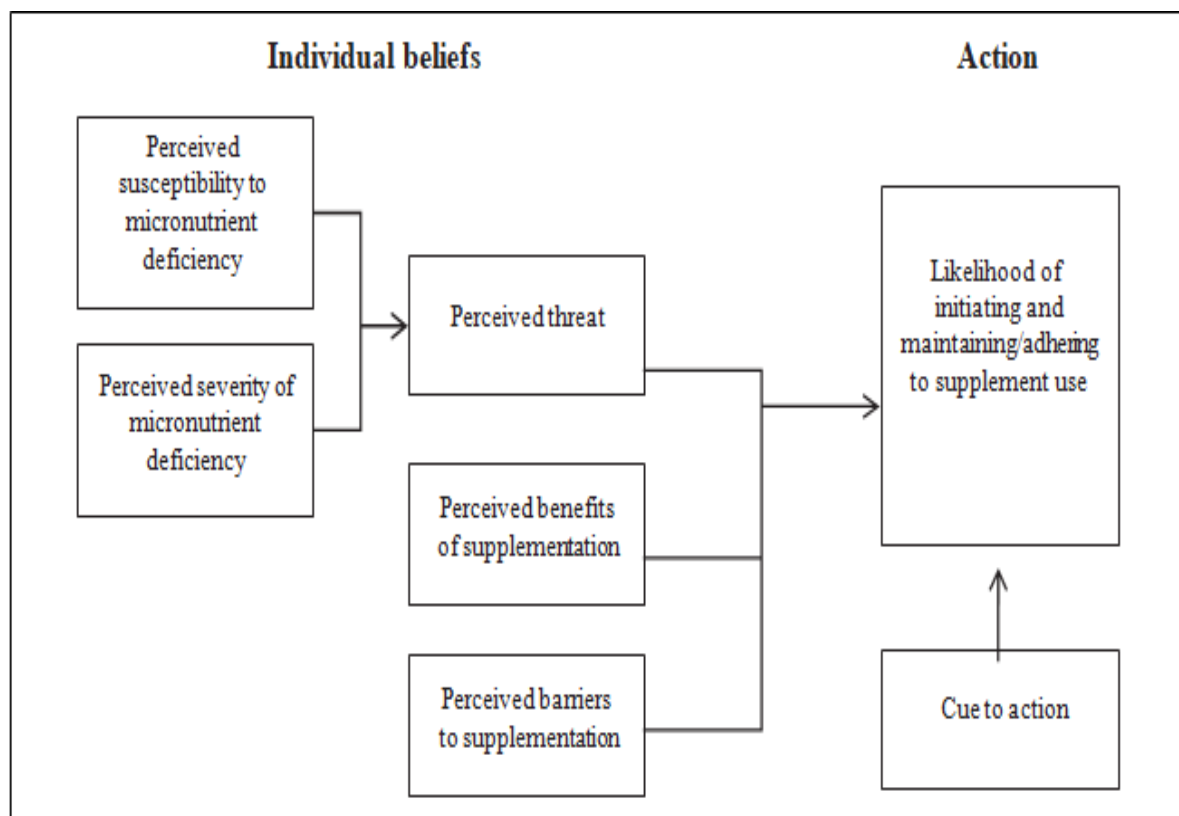
Figure 2-1. Health belief model (Champion & Skinner, 2008).

2.11.1. Perceived Susceptibility

Beliefs on the propensity to get a disease or condition are referred to as perceived susceptibility. For instance, before a woman is interested in getting a mammography, she must think there is a chance she would develop breast cancer (Ahadzadeh et al., 2015).

2.11.2. Perceived Severity

Realize the magnitude of the losses because of the impact of a disease or traumatic event triggered by your choice (Araban et al., 2017). Concerns about the seriousness of catching a disease or not treating it include assessments of both the clinical and medical outcomes ("such as death, disability, and suffering") and the possible social outcomes (such as repercussions on employment, family life, and social interactions) (Ahadzadeh et al., 2015). The correlation between vulnerability and threat intensity is known as perceived threat. (Salazar et al., 2013).

2.11.3. Perceived Benefit

The belief that the advised methods will reduce the likelihood of or the severity of illness (Abraham & Sheeran, 2015). Even if they think their own vulnerability to a serious health condition, a person's beliefs about the advantages of the numerous possible actions for minimizing the sickness hazard will affect whether this perception results in behavior change perceived threat (Demski et al., 2017).

Additionally, beliefs unrelated to health may have an impact on a person's behavior. For example, saving money by quitting smoking or making a good impression on a family member by obtaining a mammogram (Goodwin, 2015). Because of this, it is unlikely that those with idealized perceptions of vulnerability and severity will heed any recommendations for improving their health unless they also think that

doing so may benefit them by reducing the threat. (Yazdanpanah et al., 2015).

2.11.4. Perceived barriers

The convictions regarding the expense of engaging in a new conduct. The possible drawbacks of a given health action and perceived obstacles may prevent people from engaging in advised behaviors (Sulat et al., 2018).

People evaluate the perceived limitations and anticipated benefits of an activity in an inadvertent type of cost-benefit analysis. It could be able to assist me, but it might also be costly, painful, have negative side effects, or take a long time. (ÇELEBİ et al., 2021).

Because of this, the energy or force to act is given by the sum of degrees of sensitivity and severity, and the intended path of action is decided by the perception of benefits net of obstacles (Raheli et al., 2020)

2.11.5.Cues to action

The driving force behind the need for practicality. Several early versions of the HBM featured the concept of signals that can start actions (Tashiro, 2022). The only extra factors that may increase that "readiness to act" and its "perceived susceptibility and perceived benefits" are signs to stimulate action, such as physical occurrences or environmental happenings, like media attention.(Moore de Peralta et al., 2017).

But look at the role of cues from an empirical standpoint. Action cues have not yet been thoroughly studied (Nuyens et al., 2019). Despite the allure of thinking of signals as triggering processes, cues to action are difficult to analyze in explanatory surveys. A clue might be as fleeting as a sneeze or as subtle as noticing a billboard (Goodwin, 2015).

2.11.6. Perceived Self-Efficacy

Self-assurance in one's capacity to engage in a behavior. The assurance that one can successfully carry out the actions necessary to produce the results (Tarkang & Zotor, 2015). Self-efficacy expectations, often known as a person's assessment that a certain conduct would result in specific outcomes, were distinguished by Bandura from outcome expectations (Williams & Rhodes, 2016).

Although they are different from the HBM idea of perceived advantages, outcome expectations are related to it. Self-efficacy was proposed as a separate construct to be added to the HBM in 1988 along with the initial notions of susceptibility, severity, benefits, and barriers (Abraham & Sheeran, 2015).

Early versions of the HBM did not clearly contain self-efficacy (Sulat et al., 2018). Accepting a screening test or vaccine, two constrained preventive health activities that were not thought to involve complicated behaviors, was the setting in which the original model was constructed (Kalam & Parvin, 2015).

Table 2-2:Key Concepts and Definitions of the Health Belief Model (Glanz et al., 2008)

Concept.	Definition.	Application.
Perceived Susceptibility.	Belief about the chances of experiencing a risk or getting a condition or disease.	Define populations at risk level. Make perceived susceptibility more consistent with individual's actual risk.
Perceived severity.	Belief about how serious a condition and its sequelae are.	Specify consequences of risks and conditions.
Perceived benefits.	Belief in efficacy of the advised actions to reduce risk or seriousness of impact.	Define action to take, how where, when. Clarify the positive effects to be expected.
Perceived barriers.	Belief about the tangible and psychological costs of the advised action.	Identify and reduce perceived barriers through reassurance, correction of misinformation, incentives, assistance.

Cues to Action.	Strategies to activate readiness.	Provide how to information, promote awareness, use appropriate reminder systems.
Self-Efficacy.	Confidence in one ability to take action.	Provide training and guidance in performing recommended action. Use progressive goal setting. Give verbal reinforcement. Demonstrate desired behaviors. Reduce anxiety.

2.12. Prevention Behavior of Pregnant Women toward Anemia

The etiology of anemia in the affected community or individual usually determines the best course of treatment for anemia prevention or control. Typically, consuming foods rich in enough bioavailable iron may be sufficient (Lopez et al., 2016). Iron deficiency, which accounts for the majority of cases of anemia, is often the focus of anemia management (Shubham et al., 2020).

The WHO has created a set of guidelines that provide recommendations for lowering anemia in certain populations based on the prevalence of anemia among different age groups of people. (Maria Domenica Cappellini et al., 2017). The majority of therapies involve either continuous or intermittent iron supplementation (with or without folic acid) (Pea-Rosas et al., 2015). Pregnant women must take these supplements, as well as use anti-helminthes after the first trimester (Damyar, 2018).

The principal strategy for managing anemia in many countries where people needing iron intake but unable to get it through their diet on a regular basis is the use of iron-folic acid supplements, or IFAs, in pregnant women (Mekdemariam Getachew et al., 2018).

Given the complex nature of this condition, controlling anemia frequently necessitates an integrated strategy (Bekele et al., 2016). It requires identifying and addressing the relevant elements in order to be effectively combated. Additional iron intake is typically offered to susceptible individuals, especially pregnant women and small children, through iron supplements in environments where iron insufficiency is the most common cause (Siu & Force, 2015).

Food-based strategies to increase iron intake through food fortification and dietary diversity are significant, long-term measures for avoiding IDA in the general population (Bathla & Arora, 2021). In situations when iron deficiency is not the primary cause of anemia, strategies that combine iron therapy with other measures are necessary (Tandon et al., 2018). As part of measures incorporated into current programs and the primary healthcare system, other causes of anemia should be addressed. (WHO, 2016).

These tactics ought to be customized for the region, taking into account the distinct causes and incidence of anemia in a certain environment and population (van Zutphen et al., 2021).

It should be mentioned that after performing models for behavioral changes, the public should be educated about preventive actions and lifestyle changes related to anemia (Ghaderi et al., 2017). According to the findings of several research, dietary improvements have helped many nations in Europe, North America, Japan, and Australia combat ailments like anemia (Ahmad et al., 2015).

In order to prevent anemia in teenage girls, dietary advice and nutrition education initiatives must be implemented (Ghajari et al., 2016). As a result of the significance of the role that schools play in the field of

education, interventions to promote nutritional awareness include the development of nutrition education programs in schools (Munira & Viwattanakulvanid, 2021).

2.13. Awareness and Health Beliefs of Anemia and its relation to Prevention Behavior

Pregnancy anemia is a significant issue in both industrialized and underdeveloped nations. Nutritional iron insufficiency is the most frequent cause of anemia, with research indicating that up to 90% of maternal anemia may result from insufficient dietary iron consumption. The presence of worms, HIV infection, and genetic anomalies are other factors, though. In Ghana, certain tactics are employed to prevent and control anemia in pregnant women, including education and awareness-raising, nutritional supplements, parasite care, and prevention. (Appiah et al., 2020).

Maternal knowledge and views regarding anemia are important because they may influence women to take iron supplements during pregnancy and after birth, which may affect the iron status of both the mother and the child (Souganidis et al., 2012). Insufficient maternal knowledge and favorable anemia beliefs may deter women from taking iron supplements throughout pregnancy and after delivery by boosting women's preventative behavior. Higher rates of anemia in the mother will be caused by lower maternal education (Salama et al., 2018). Even though the Indian government has launched numerous programs, anemia is still more common, particularly in rural areas. Poor health conditions may still be influenced by rural women's ignorance of anemia and lack of understanding of preventive measures (Tashara, 2015).

2.14. Previous Studies

1.   **Marziehe et al., (2017).**

Utilizing Health Belief Model to Promote Preventive Behavior against Iron-Deficiency Anemia among Pregnant Women.

Methods: Quasit-experimental design was conducted on 80 pregnant women who was selected randomly. The information were gathered by self-administered constructed questionnaire based on health beliefs model.

Results: there was statistically significant difference between both intervention and control groups demographic characteristic information and Health belief model constructs after program implementation.

Conclusion: The present study concluded that educational programs based on HBM has been effective on the promote preventive behaviors of pregnant mother toward anemia and recommended to implementing session   in health centers based on health belief model to reduce the consequences of anemia.

2.   **Nelofar et al., (2018).**

Awareness of anemia during pregnancy among the pregnant women attending a health facility in District Srinagar.

Objective to evaluate the awareness of pregnant ladies attending a health facility in District Srinagar toward anemia.

Methodology: All pregnant women attending the health care facility from April, 2016 to June, 2016. A total sample was women were interviewed using pre structured questionnaire.

Results: Majority women were in the age group > 25 years (51%), literate (62%) and para (>2) were 47%. 68% were unaware of the of anemia symptoms, 96.2% were unaware of anemia complications. 58% were

unaware that iron rich food can promote anemia and 94.6% were unaware that iron should not be taken with milk, coffee and tea.

Conclusion: There is lack of awareness regarding complications of anemia in pregnancy. There is a need for generating awareness among pregnant women regarding prevention and treatment of anemia in pregnancy. The role of mass media in imparting the knowledge can't be ignored.

3. (Salama, A. M. 2018)

Utilizing Health Belief Model to Enhance the Preventive Behavior against Iron-Deficiency Anemia among Pregnant Women

Methods: In 2018, convenient sampling approach was used to pick 100 pregnant women for this quasi-experiential study. The present study was conducted at Antenatal Outpatient clinic in Benha university hospitals

Results: Before the education, there was no discernible change between the control and intervention groups' knowledge, Health belief model, or behavior (P>0.001). However, after the education, there was a substantial difference (P 0.001) in the mean scores for knowledge, perceived susceptibility, perceived benefits, perceived barriers, perceived severity, perceived self-efficacy, signals to action, and performance in both intervention and control groups.

Conclusion: The study's findings showed that teaching using the HBM model had a positive impact on pregnant' awareness, and behavior when it comes to preventing anemia. In order to develop and implement educational interventions to prevent anemia and expensive complications in pregnant women, this pattern might be utilized as a framework improve their health belief and awareness.

4. Ademuyiwa et al. (2020)

Investigated the level of knowledge about anemia and its prevention among pregnant women who visited the prenatal clinic at the Lagos University Teaching Hospital, Nigeria.

Methods: A descriptive cross-sectional research was conducted on 182 pregnant women who attended the prenatal clinic at LUTH in Lagos, Nigeria. The clinic's estimated 70 pregnant patients every clinic, which occurs four times a week, voted on the best answers. The information was gathered through the use of a standardized self-administered questionnaire, and SPSS, version 22, was utilized for statistical analysis. Descriptive and inferential statistics were used to conduct a chi-square test for the relationship between the variables at a P 0.05 level of significance. LUTH's Human Research Ethical Committee gave its stamp of approval (ADM/DCST/HREC/APP/2589) for this study to proceed ethically. Participants gave their consent willingly, and they were assured that their responses would remain private and confidential.

Results: The largest demographic (33.3%) was comprised of individuals aged 26-30 (mean age, 28.18 0.84 years). Seventy-three point eight percent of the women reported having excellent general practices for avoiding anemia in pregnancy, and six-eight point eight percent reported having a high degree of anemia awareness. There was no statistically significant correlation between respondents' anemic knowledge and their ability to prevent the condition (2 = 1.533, P = 0.216).

Conclusion: Positive results for both mother and child during pregnancy may be achieved by increasing awareness among pregnant moms and providing comprehensive health education on anemia prevention, as shown by the study.

5. (AlAbedi et al, 2020)

Assessment of Pregnant Women Knowledge and Practices Concerning Iron Deficiency Anemia at Al-Amara City/Iraq

Objectives: To assess knowledge and practices associated with the prevention of anemia among pregnant women and to discover the association between their practices; knowledge and socio-demographic characteristic.

Methodology: descriptive study design was conducted on (280) pregnant women who was selected purposively. This study conducted at 6 primary healthcare centers in Al-Amara city, the centers were selected by using random technique.

Results: (76.1%) of the participants had moderate knowledge and moderate practices (75.5%) toward anemia. The results indicated a high relationship between the knowledge and practice of women with the variables under study (p= 0.000).

Conclusion: The study concluded that the majority of participants have insufficient knowledge with unfavorable practices towards preventing of anemia. Provide nutritional information about healthy diet habits and rich iron foods is an essential step towards reducing the prevalence of anemia among pregnant women.

6. Abd El Ghafar et al., 2021.

Assessment of Primary School Students knowledge, practice and health beliefs regarding Prevention of Iron Deficiency Anemia.

Aim: The study aimed to assess knowledge, practice and health beliefs of primary school students regarding Iron Deficiency Anemia.

Study design: Descriptive study was applied to achieve the goal of the current study. Setting: This study was conducted at three mixed primary schools were selected randomly in Beni suef governorate. Sample: A multi stage random sample technique of 300 students was used. Instrument: Two instrument were used for data gathering one including socio demographic information of students and their parents, student's knowledge and practice related to iron deficiency anemia. The second instrument including Health beliefs of primary school students regarding Iron deficiency anemia.

Results: 40 % of primary school students had poor knowledge about Iron deficiency anemia. 77 % of them had unsatisfactory practice scores related to iron deficiency anemia. 67.7 % of them had negative health beliefs toward iron deficiency anemia. There were a statistically relation between information of students and their parents and knowledge of practice and health beliefs.

Conclusion: The current study concludes that, more than one third of studied students had poor knowledge anemia. More than half of them had poor behavior related to anemia. More than half of primary school students had negative health beliefs anemia. As well as, there was significance statistical relationship between socio demographic characteristics of primary school students and their health beliefs.

Recommendations: Applying an educational approach to parent about the significant of prevention of anemia.

7. (Sahib et al, 2022)

Assessment of pregnant women knowledge about iron deficiency anemia at obstetrics and gynecology hospital in Holly Karbala Governorate

Aim: The f study was to assess the knowledge of women about anemia during pregnancy and to find out the association between knowledge and sociodemographic characteristics of women.

Method: Across-sectional study conducted on (85) of pregnant women who attended the obstetrics and gynecology hospital 9060 in Karbala. The information's were gathered by using questionnaire include 3 parts sociodemographic, obstetric and health history and knowledge.

The results show that the majority participant have High Knowledge (49.4%), 25.9% had moderate Knowledge and (24.7%) were of Poor Knowledge.

Conclusion: The study concludes that the majority of pregnant women in Karbala city have moderate knowledge toward anemia.

8. (Al-Sattam et al, 2022)

Knowledge about Anemia in Pregnancy among Females Attending Primary Health Care Centers in Baghdad

Aim: The of study was to assess the knowledge of women about anemia during pregnancy and to find out the association between knowledge and sociodemographic characteristics of women.

Methods: Across-sectional study conducted on 400 women between 18 and 45 years attending the selected primary health care centers during a period from December 1, 2020, to April 1, 2021. The information's were gathered by constructed questionnaire.

Results: In this study, the findings showed that 60% had moderate knowledge. The results indicated a statistically significant associations between knowledge sociodemographic characteristics.

Conclusion: The majority of women have moderate knowledge about anemia in pregnancy. Young women with low educational level, and unemployed, were more likely to have low level of knowledge

Chapter Three
Methodology

Chapter Three

Scientific research is a collection of scientific standards, criteria that are followed when conducting research. As a result, scientific research methodology is key to how successful scientific research is built and organized, so that everyone who reads it and looks at its lines benefits from it. As a result, we should discuss the various scientific research methods that a researcher can employ while conducting a well-structured scientific research. The study design and all other scientific steps taken by the researcher from the beginning to the end of the study will be described in this chapter.

3.1. Study Design

Research participants are interviewed as part of a correlational study design to provide a detailed description of the phenomena being studied, including how they manifested and to what extent they were present within the study's time frame.

The correlational technique is carried out by asking the study subjects about their awareness and health beliefs and how these relate to the behavior they take to prevent anemia. The study's objective is to assess the relationship between study factors "awareness, health beliefs vs. preventative behavior." This approach involves first learning about the issue, then detailing its nature and scope, and then collecting relevant data.

The descriptive correlational study design is done through the limit includes the following:

1. Objective limits: The subject of the study was limited to level of awareness, health beliefs and preventive behavior.
2. Spatial limits: The spatial boundaries of the study were limited to Obstetrics and Gynecology Teaching Hospital in Holy Kerbela.

3. Time limits: The study was conducted for the period of January 1st to 9th November 2022.

4. Human limits: The study was conducted on pregnant women.

3.2. Administrative Arrangements:

Before collecting the study data, the following official clearances were sought from appropriate authorities:

1. Approval of the study by the University of Kerbela/ College of Nursing /Scientific Research Ethics Committee (Appendix A).

2. The Kerbela Health Department /Training and Human Development Center (Appendix B) had to give its stamp of approval before a visit to the hospital could be made.

3. Official approval has been gained from Obstetrics and Gynecology Teaching Hospital in Kerbela (Appendix B).

3.3. Setting of the Study:

This study was conduct in Kerbela Obstetrics and Gynecology Teaching Hospital in Kerbela city. It is the only teaching hospital in Kerbela city that specialized in pregnancy, delivery, and other female reproductive problems, such as birth control, and infertility.

3.4. Study's sample:

The (250) women who are participating in the study as part of a purposeful (non-probability) sample those who are attend the hospital. Inclusion in this sample is contingent upon meeting the following conditions:

3.4.1. Inclusions criteria:

1. All pregnant women with varying levels of education
2. Women who consent to being included in the study sample.

3.4.2. Exclusion Criteria:

1. Women who selected for pilot study.
2. Pregnant women who has signs of onset labor.
3. Women who disagree to take part or refused to participate in present study.
4. Women with chronic diseases.

3.5. Study Instruments:

With the researcher's objectives of elucidating the relevance and significance of the study by gathering responses to the research questions, a questionnaire was developed as one of the tools to help collect data that contribute to accomplishing the outcomes predicted by the study (Appendix C).

The researcher divided this instrument into four sections, which include:

Part I A: This section contains socio-demographic data, such as the age of women, levels of education, occupations, and monthly incomes, Family type, places of residence, anemia history, and informational sources.

Part I B: This section contains obstetric history data, such as Gravida, Para, abortion, and the gestation age.

Part II: This section deals with pregnant women awareness towards anemia and includes 19-item survey measuring pregnant women's awareness of anemia using a 3-point Likert scale (1—incorrect, 2—uncertain, and 3—correct) was developed based on prior research.

Part III: This section deals with the health beliefs model against anemia was adopted and created by Baharzadeh et al. (2017) and consists of 30 questions measured on a 5-point Likert scale, such as "0—strongly Disagree, 1—Disagree, 2—Neutral, 3—Agree, and 4—strongly Agree".

Part IV: This section deals with Prevention behavior for anemia is based on prior research and consists of 13 items with Likert scale ratings of (1—Never, 2—Sometimes, and 3—Always).

Due to the researcher's desire for reliable and trustworthy data, the questionnaire was carefully crafted following all of the established protocols. To evasive and convoluted explanations. The questions were of a closed format, the answers to which could only be found by considering what was considered proper.

3.7. Validity of the Questionnaire

On the one hand, validity refers to the questionnaire's inclusion of all factors that must be included in the analysis and, on the other, the clarity of its contents. The validity of the questionnaire is defined as its capacity to measure what it was designed to analyze. On the other hand, terminology ought to be clear to all users.

The questionnaire was distributed to 12 experts in various nursing disciplines to ensure its validity (Appendix D). The experts panel included (3) doctors in the specialty of internal medicine from ministry of health, (3) doctors in obstetrics and gynecology specialty from ministry of health, (3) faculty members at the college of nursing university of Kerbela, (2) faculty members at the higher health institute Kerbela, in addition to (1) faculty members at the college of medicine Iraqi university. Experts were polled on the linguistic, contextual, and measurability significance of each survey question, as well as their associations with the research variables.

Minor adjustments were made in accordance with the experts' ideas when they provided feedback, and the final document was created in preparation for the study.

3.8. Pilot Study:

This study was conducted to determine the stability and credibility of the study tool, clarity and its efficiency which confirmed, and standard time required to collect data for each subject which can estimated during the interview procedures and to difficulties identification that may encounter.

The pilot study aimed to achieve the following objectives.

1. Adequacy of research tools development and testing
2. Evaluation of the instrument's viability.
3. Identifying any logistical issues that may arise as a result of the proposed methods.
4. Assessment of proposed data analysis approaches for the detection of potential issues.
5. The researcher's time estimate during data collecting.

Results of pilot study:

1. The questionnaire is reliable.
2. The time required for answering the questionnaire ranged from (15-20) minutes.
3. The instrument items were clarify and understood the phenomenon underlying of the study (Table 3-1).

Before the questionnaire reached its final form, it went through the following stages:

1. Determining the data that will be collected through the questionnaire according to the study questions.
2. Determining the method and format of the questionnaire.
3. Determining the type of criterion that determines the type of answer in the questionnaire.

4. Presenting the questionnaire to the supervising to express his opinion and observations in developing the questionnaire and modifying it based on his observations.

5. Presenting the questionnaire to a number of panel of experts to express their opinion and observations in developing the questionnaire and modifying it based on what they submitted.

6. Conducting a reliability test on it by distributing the questionnaire to a sample of 25 Pregnant.

7. Writing the questionnaire in its final form, then printing, reviewing and distributing it.

Reliability of the Questionnaire:

Making sure the same people get the same results when given the same test at various points in time is an important part of making sure the study instruments are reliable. The study was conducted on a sample of 25 women who made up 10% of the total population. This sample's participants were ultimately left out of the primary sample. Coefficient of dependability based on the Cronbach's Alpha test statistic, as seen below.

Table3-1: Reliability of the Studied Questionnaire (*n=25*).

Reliability.	
Scale	**Alpha Cronbach.**
Awareness.	.76
Health beliefs.	.73
Prevention Behavior.	.84

3.9. Ethics-Considerations

The researcher has a number of duties that must be met during course of the study, not the least of which is a commitment to ethical conduct. Before

beginning to gather information from the society chosen for the research, the researcher should make clear the principal goal and specific objective of this investigation for the sample to be included in the research, in addition to adhering to the strict confidentiality of the information taken from the sample population and obligated to use it for scientific reasons related to the research only.

Before collecting data from the study's sample, the researcher described the study's scientific purpose and aim. Pregnant ladies have informed the study's aims orally and asked to participate voluntarily. Once they agreed to participate, a questionnaire ensured their privacy.

3.10. Methods of Data Collection

The information was gathered from 25th Feb to 5th April, the gathering of data through interviewing techniques. After getting the Karbala Health Directorate's permission and confirming the reliability and validity of the survey. The researcher conducted interviews with study participants (pregnant women), gave them instructions, clarified any concerns they had about the form, pushed them to participate, and expressed gratitude for their assistance. After performing the crucial procedures that must be incorporated into the research design, the interview approaches were utilized individually, and each interview took fifteen to twenty minutes.

3.11. Statistical Data Analysis Approach

The research employed the SPSS-20 and Microsoft Excel (2010) programs to quantitatively analyze the data gathered from the study sample in to arrive at the findings, establish the links between the parameters, and derive the research's final findings based on a series of statistical tests.

3.11.1. Descriptive Approach

When describing a dataset quantitatively with tables and charts, descriptive statistics uses a variety of mathematical and statistical techniques. Descriptive statistics always aim to present and describe the data which is required to be processed, organized, summarized and categorized, as well as presenting them in a simple and clear manner that makes it easier for the recipient to recognize and understand its content. The analysis performed through use:

A. Statistical tables "Frequencies and percent" which are:

$$\% = \frac{Frequency}{Sample\ Size} \ x100$$

B. Average of the scores MS and the overall average score (M±).

The average score can be calculated by using the following:

$$M.S = \frac{\Sigma\ ri = 1Fi\ x\ Si}{\Sigma\ ri = \ 1Fi} \ x100$$

Awareness Scale

What follows is a summary of the replies based on the total mean rating:

$$total\ mean\ of\ scores = \frac{Maximum\ total\ sores - minimum\ total\ sores}{3}$$

M=19-31 refers to Poor Low Awareness.

M=32-44 refers to Moderate Awareness.

M=45-57 refers to High Awareness.

Health Beliefs Scale

The overall responses according to total mean of score which follow:

$$total\ mean\ of\ scores = \frac{Maximum\ total\ sores - Minimum\ total\ sores}{3}$$

M=0-40 refers to Poor Health Beliefs.

M=40.1-80 refers to Moderate Health Beliefs.

M=80.1-120 refers to Good Health Beliefs.

Prevention Behavior Scale

What follows is a summary of the replies based on the total mean rating:

$$total\ mean\ of\ scores = \frac{Maximum\ total\ sores - Minimum\ total\ sores}{3}$$

M=13-21 refers to Poor Preventive Behavior.

M=22-30 refers to Moderate Preventive Behavior.

M=31-39 refers to Good Preventive Behavior

C. Standard Deviation test ±*SD*.

$$SD = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(Xi - \bar{\chi})^2}$$

D. It uses a correlational coefficient "Cronbach alpha" used in estimating the internal consistency of the study tool, which can be calculated by using the following:

$$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=1}^{K}\sigma_{ii}}{\sum_{i=1}^{K}\sum_{j=1}^{K}\sigma_{ij}}\right]$$

3.11.2. Inferential approach

1. Analysis of Variance (ANOVA)

For equality of means, is used (Variance test when the mean parameter varies).

Source of variance	Sum of square	d.f	Mean square	F
Between Groups	$SS_B = \sum \frac{(\sum xP1)^2}{n} - \frac{(\sum xP)^2}{n}$	$df_B = K-1$	$\frac{MS\beta}{MS\beta}$	
Within Groups	$SS_w = \sum \frac{(\sum xP1)^2 \quad (\sum xP)^2}{N}$	$df_w = N-k$	$\frac{SSw}{DFw}$	$\frac{MSB}{MSW}$
Total	$SS_T = \sum \frac{(\sum xP1)^2 \quad (\sum xP)^2}{N}$	$df_T = N-1$		
P-value (≤ 0.05)				

2. "Sample Independent t-test"

Unneeded patch the t-test examines if there's a statistically significant distinction between the groups' means.

$$t = \frac{\mu_A - \mu_B}{\sqrt{\left[\frac{\left(\Sigma A^2 - \frac{(\Sigma A)^2}{n_A}\right) + \left(\Sigma B^2 - \frac{(\Sigma B)^2}{n_B}\right)}{n_A + n_B - 2}\right] \cdot \left[\frac{1}{n_A} + \frac{1}{n_B}\right]}}$$

$(\Sigma A)^2$: Sum of data set A, squared (Step 2).
$(\Sigma B)^2$: Sum of data set B, squared (Step 2).
μ_A: Mean of data set A (Step 3)
μ_B: Mean of data set B (Step 3)
ΣA^2: Sum of the squares of data set A (Step 4)
ΣB^2: Sum of the squares of data set B (Step 4)
n^A: Number of items in data set A
n^B: Number of items in data set B

3. Spearman's Correlation Coefficient

This test is used for qualitative variables

$$P = 1 - \frac{6 \sum d2_i}{\eta(\eta2 - 1)}$$

$NS:> 0.05$ Non significantly-differences.

$S:< 0.05$ Significantly-differences.

Chapter Four

Results

And

Analysis

Chapter Four.

This chapter extensively introduces the outcomes of the research in tables and these refer to the objectives of this report, which are as follows:

Table 4.1.Descriptive Statistic Analysis of Demographic Variables SDVs.

SDVs	Classification	Freq.	%
Age/years (M± SD= 26±7.13)	<20years old	51	20.4
	"20-29years old"	111	44.4
	"30-39years old"	65	26.0
	"≥40 years old"	23	9.2
Education Level	Unable to read and write	38	15.2
	Read and write	55	22.0
	Secondary school	79	31.6
	Institute	53	21.2
	College and above	25	10.0
Occupation	Student	13	5.2
	Employed	53	21.2
	House wife	184	73.6
Income/ month	Enough	70	28.0
	Somewhat Enough	128	51.2
	Not enough	52	20.8
Family Type	Nuclear	121	48.4
	Extended	129	51.6
Residents	Urban	195	78.0
	Rural	55	22.0
History of Anemia	Yes	182	72.8
	No	68	27.2
Sources of Information	Health Care Provides	137	54.8
	Internet	8	3.2
	Social Media	38	15.2
	Family & Friend	67	26.8

As the results reveal, the average age of the participants was 26 (7.13), with the biggest percentage (44.4%) being between the age range of 20 to 29. Regarding participants' education level, most of participants were secondary school graduated (31.6%). In regard with occupation, the housewife were predominated (73.6%).

Concerning monthly income, half of study sample were somewhat enough income (51.2%). Family type related findings, most of families were extended (51.6%). Residents associated results, the urban residents were records highest percentage (78%), in terms of history of anemia, more than half of study sample had history of anemia. Sources of information associated findings, pregnant women use a health care provides to gain information related anemia prevention.

Table 4.2.Descriptive Statistic Analysis of Obstetric History.

Factors	Classification	Freq.	%
Number of Pregnancy (Gravida)	1	18	7.2
	2-4	161	64.4
	≥5	71	28.4
Number of Birth (Para)	1-3	195	78.0
	≥4	55	22.0
Abortion	Present	65	26.0
	Absent	185	74.0
Gestational Age	1st Trimester (1-3 month)	19	7.6
	2nd Trimester (4-6 month)	41	16.4
	3rd Trimester (7-9 month)	190	76.0

In terms of frequencies and percentage, out of 250 pregnant women participated in current study showed (64.4%) Gravida in 2-4 time, (78%) were 1-3 Para, (74%) absent abortion and (76%) at the time of data collection at third trimester.

Table4-3-1.Pregnant Women Awareness towards Anemia.

List	Awareness Items	Weighted	Freq.	%	M.s.	Ass.
1	"Anemia is a low red blood cell concentration or hemoglobin level".	Incorrect	67	26.8	1.87	Moderate
		Uncertain	149	59.6		
		Correct	34	13.6		
2	Malnutrition can cause anemia.	Incorrect	31	12.4	2.36	High
		Uncertain	98	39.2		
		Correct	121	48.4		
3	Repeated pregnancies at short intervals	Incorrect	77	30.8	1.90	Moderate

	less than two years is risk factor for anemia in pregnancy.	Uncertain	120	48.0		
		Correct	53	21.2		
4	History of heavy blood loss due to menstruation can cause anemia.	Incorrect	101	40.4	1.75	Moderate
		Uncertain	111	44.4		
		Correct	38	15.2		
5	Shortness of breathing, heart palpitation and chest pain are symptoms of anemia.	Incorrect	76	30.4	1.99	Moderate
		Uncertain	100	40.0		
		Correct	74	29.6		
6	Anemic patients normally experience fatigue and tiredness.	Incorrect	70	28.0	2.06	Moderate
		Uncertain	95	38.0		
		Correct	85	34.0		
7	Dizziness and Headache are signs of anemia.	Incorrect	86	34.4	1.98	Moderate
		Uncertain	83	33.2		
		Correct	81	32.4		
8	Paleness of skin and whitens of nails are a sign of anemia.	Incorrect	68	27.2	2.05	Moderate
		Uncertain	101	40.4		
		Correct	81	32.4		
9	Anemia can affect the health of pregnant women and fetus.	Incorrect	70	28.0	2.06	Moderate
		Uncertain	95	38.0		
		Correct	85	34.0		
10	Anemia could lead to low birth weight babies.	Incorrect	76	30.4	1.95	Moderate
		Uncertain	110	44.0		
		Correct	64	25.6		
11	Anemia can cause preterm birth.	Incorrect	122	48.8	1.66	Low
		Uncertain	92	36.8		
		Correct	36	14.4		
12	Anemia can cause increase obstetric hemorrhage	Incorrect	90	36.0	1.80	Moderate
		Uncertain	121	48.4		
		Correct	39	15.6		
13	Adherence to iron pill supplements along with proper diet is necessary during pregnancy	Incorrect	75	30.0	1.98	Moderate
		Uncertain	106	42.4		
		Correct	69	27.6		
14	Iron tablets can be taken be taken with orange juice	Incorrect	77	30.8	1.92	Moderate
		Uncertain	117	46.8		
		Correct	56	22.4		
15	Iron tablets can't be taken with milk or its derivatives.	Incorrect	93	37.2	1.74	Moderate
		Uncertain	130	52.0		
		Correct	27	10.8		
16	Diet rich in iron, protein and vitamin c can protect pregnant women from getting anemia	Incorrect	74	29.6	2.00	Moderate
		Uncertain	103	41.2		
		Correct	73	29.2		
17	Meat, liver and green vegetables are rich	Incorrect	68	27.2	2.02	Moderate

		Uncertain	110	44.0		
	source of iron	Correct	72	28.8		
18	Legumes and egg are rich sources of protein	Incorrect	72	28.8	1.98	Moderate
		Uncertain	109	43.6		
		Correct	69	27.6		
19	Citrus fruits are rich sources of vitamin C	Incorrect	69	27.6	1.99	Moderate
		Uncertain	113	45.2		
		Correct	68	27.2		

(M.s) Mean of scores, Level of Assessment (Low= 1-1.66, Moderate=1.67-2.33, High ≥2.34]).

In terms of statistical mean, this table illustrated that the pregnant women expressed a moderate responses regards awareness towards anemia at all items of the scale as indicated by moderate mean of scores (*M.s= 1.67-2.33*) except, the pregnant women expressed a high awareness in terms of (*Malnutrition can cause anemia*) as indicated by high mean of scores (*M.s ≥2.34*), as well as, women expressed a low awareness in terms of (Anemia can cause preterm birth) as indicated by low mean of scores (*M.s≤1.66*).

Table4-3-2: Overall Assessment of Pregnant Women Awareness towards Anemia

Pregnant Awareness	Freq.	%	M ± SD
Low (*M=19-31*)	68	27.2	
Moderate (*M=32-44*)	102	40.8	37.08±11.61
High (*M=45-57*)	80	32.0	
Total	250	100.0	

M: Mean for total score, SD=Standard Deviation for total score.

The results show (40.8%) of pregnant women exhibited a moderate awareness towards anemia as described by moderate average which equal to 37.08 (±11.61).
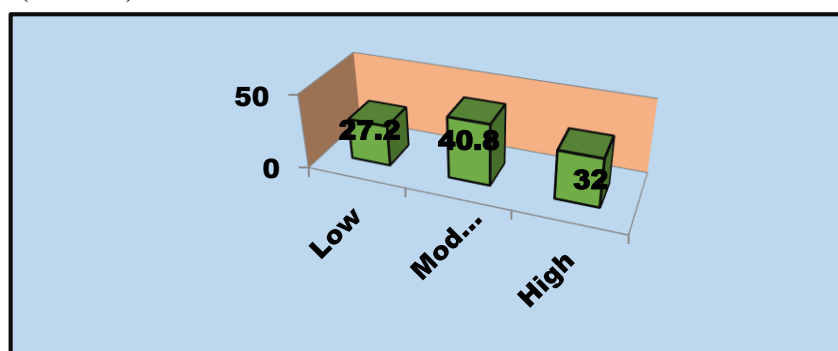
Figure 4-1. Pregnant Women Awareness towards Anemia

Table4-4-1.Pregnant Women Health Beliefs towards Anemia

List	Health Beliefs Items	Strongly Disagree	Disagree	Neutral	Agree	Strongest agree	*M.s.*	*Ass.*
	Perceived Susceptibility							
1	Certain conditions of pregnancy predispose to anemia.	71	5	6	84	84	*2.42*	*Moderate*
2	I think the rate of anemia in pregnancy is high.	77	11	11	82	69	*2.22*	*Moderate*
3	Because my nutrition is good, I do not need to take supplements (pills).	104	28	10	71	37	*1.64*	*Moderate*
4	I may have anemia but no symptoms.	99	76	14	14	47	*1.34*	*Moderate*
	Perceived Severity							
5	I'm worried about not taking the recommended supplements during pregnancy.	79	62	12	21	76	*1.81*	*Moderate*
6	In my opinion, anemia in pregnancy can endanger the health of a pregnant woman.	65	1	0	76	108	*2.64*	*Moderate*
7	I think anemia in pregnancy can cause insufficient fetal growth.	68	5	9	64	104	*2.52*	*Moderate*
8	Not taking folic acid pills can cause an abnormal baby to be born.	79	75	31	11	54	*1.54*	*Moderate*
9	I think anemia in pregnancy can increase the rate of postpartum complications.	65	6	6	71	102	*2.56*	*Moderate*
	Perceived Benefits							
10	If I take folic acid from during first three months of pregnancy, the chances of my baby having a congenital neural tube defect are greatly reduced.	73	6	78	20	73	*2.06*	*Moderate*
11	Consumption of foods containing iron and folic acid reduce postpartum complications.	127	1	23	11	88	*1.73*	*Moderate*
12	Taking supplements and folic acid promotes the health of pregnant women.	73	1	17	68	91	*2.41*	*Moderate*
13	Consumption of foods containing iron and folic acid (such as liver, lentils, vegetables, heart, kidney, etc.) reduces postpartum complications.	66	1	20	71	92	*2.49*	*Moderate*
14	Consumption of foods containing vitamin A, B12, B2, reduces the incidence of anemia.	131	12	34	4	69	*1.47*	*Moderate*
	Perceived Barriers							
15	I do not take iron pills because I am afraid of complications (nausea and vomiting, constipation).	101	34	16	60	39	*1.61*	*Moderate*

16	It is difficult for me to take supplements regularly due to the bad economic situation.	166	16	17	9	42	*0.98*	*good*
17	Due to the poor economic situation, it is difficult for me to consume foods containing iron (meat, legumes).	102	21	17	68	42	*1.71*	*Moderate*
18	Due to high costs, I do not do anemia tests.	167	28	8	6	41	*0.90*	*good*
19	I do not know the correct way to take the supplements.	161	21	27	6	35	*0.93*	*good*
	Perceived Self Efficacy							
20	I do not know to deal with the side effects of pills.	102	26	18	63	41	*1.66*	*Moderate*
21	Despite my great interest in tea, I can refrain from eating it after a meal.	97	6	28	65	54	*1.89*	*Moderate*
22	Although iron tablets cause nausea، I can take them.	83	31	2	67	67	*2.02*	*Moderate*
23	Despite the high cost of the laboratory, I can have anemia tests to keep myself healthy.	74	16	5	78	77	*2.27*	*Moderate*
24	Considering that I am a forgetful person, I can take iron and folic acid pills regularly for my health.	83	14	5	73	75	*2.17*	*Moderate*
25	Due to my poor economic situation، I can substitute eggs and legumes for meat and eat them regularly.	69	18	11	81	71	*2.27*	*Moderate*
	Cues to Action							
26	If I want، I can get the right health information about anemia and its prevention.	73	26	13	77	61	*2.11*	*Moderate*
27	Seeing or hearing about the state of anemia in pregnancy leads to the proper use of iron supplements and foods.	78	20	4	60	88	*2.24*	*Moderate*
28	Fear of anemia leads to proper consumption of iron supplements and foods.	66	24	4	67	89	*2.36*	*Moderate*
29	My husband encourages me to eat the right foods and supplements.	76	13	9	66	86	*2.29*	*Moderate*
30	Fear of harming my fetus causes me to take iron supplements and foods.	64	19	1	67	99	*2.47*	*Moderate*

(M.s) Mean of scores, Level of Assessment (Poor= 0-1.33; Moderate=1.34-2.66; Good= 2.67-4).

In terms of statistical mean, this table illustrated that the pregnant women expressed a moderate responses regards health beliefs towards anemia at all items of the scale as indicated by moderate mean of scores (*M.s= 1.34-2.66*) except, the pregnant women expressed a good health beliefs in terms of (the difficulties to take supplements regularly due to the bad economic situation, correct way to take

the supplements and due to high costs, I do not do anemia tests) as indicated by low mean of scores ($M.s \leq 1.33$).

Table4-4-2: Overall Assessment of Pregnant Health Beliefs towards Anemia

Pregnant Health Beliefs	Freq.	%	$M \pm SD$
Poor ($M=0$-40)	65	26.0	
Moderate ($M=40.1$-80)	104	41.6	58.73±34.90
Good ($M=80.1$-120)	81	32.4	
Total	250	100.0	

M: Mean for total score, SD=Standard Deviation for total score.

Findings demonstrated that the (41.6%) of pregnant women exhibited a moderate health beliefs towards anemia as described by moderate average which equal to 58.73 (±34.90).
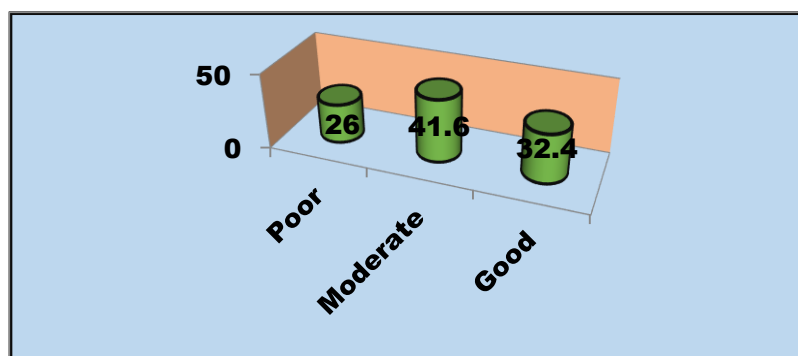
Figure 4-2. Pregnant Women Health Beliefs towards Anemia.

Table4-5-1.Pregnant Women Prevention Behavior of Anemia

List	Preventive behavior Items	Weighted	Freq.	%	M.s.	Ass.
1	I eat foods rich in iron such as red meat and fish	Never	147	58.8	1.54	Poor
		Sometime	72	28.8		
		Always	31	12.4		
2	I eat foods rich in protein such as (chicken, fish and eggs).	Never	147	58.8	1.60	Poor
		Sometime	55	22.0		
		Always	48	19.2		
3	I eat green vegetables at every meal such as spinach, greens chard.	Never	158	63.2	1.64	Poor
		Sometime	24	9.6		

		Always	68	27.2		
4	I eat foods rich in vitamin C such as every meal such as such as orange, lemon and tomato	Never	145	58.0	*1.71*	*Moderate*
		Sometime	32	12.8		
		Always	73	29.2		
5	I eat legumes (chickpeas, lentils and beans).	Never	147	58.8	*1.58*	*Poor*
		Sometime	60	24.0		
		Always	43	17.2		
6	I eat foods rich in vitamin A such as (liver, orange and carrots).	Never	148	59.2	*1.64*	*Poor*
		Sometime	45	18.0		
		Always	57	22.8		
7	I eat the foods I love regardless of their nutritional content.	Never	152	60.8	*1.68*	*Moderate*
		Sometime	27	10.8		
		Always	71	28.4		
8	I drink tea or coffee immediately after eating.	Never	181	72.4	*1.42*	*Poor*
		Sometime	32	12.8		
		Always	37	14.8		
9	I drink dairy products with meals at the same time	Never	166	66.4	*1.52*	*Poor*
		Sometime	38	15.2		
		Always	46	18.4		
10	I take anemia supplement pills regularly and according to the recommended dosage.	Never	163	65.2	*1.55*	*Poor*
		Sometime	37	14.8		
		Always	50	20.0		
11	I take anemia supplements with orange juice.	Never	192	76.8	*1.36*	*Poor*
		Sometime	25	10.0		
		Always	33	13.2		
12	Refer to primary health care centers regularly during pregnancy.	Never	154	61.6	*1.60*	*Poor*
		Sometime	42	16.8		
		Always	54	21.6		
13	I Get anemia checked regularly during pregnancy.	Never	162	64.8	*1.61*	*Poor*
		Sometime	23	9.2		
		Always	65	26.0		

(M.s) Mean of scores, Level of Assessment (Low= 1-1.66, Moderate=1.67-2.33, High ≥2.34).

In terms of statistical mean, this table illustrated that the pregnant women expressed a poor responses regards preventive behavior of anemia at all items of the scale as indicated by low mean of scores (*M.s≤1.66*) except, the pregnant women expressed a moderate preventive behavior in terms of (*I eat foods rich in vitamin C such as every meal such as such as orange, lemon and tomato* and *I eat the foods I love regardless of their nutritional content*) as indicated by moderate mean of scores (*M.s=1.67-2.33*).

Table4-5-2: Overall Assessment of Pregnant Women Prevention Behavior of Anemia

Preventive Behavior	Freq.	%	$M \pm SD$
Poor (*M=13-21*)	141	56.4	
Moderate (*M=22-30*)	53	21.2	*20.45±8.70*
Good (*M=31-39*)	56	22.4	
Total	250	100.0	

M: Mean for total score, SD=Standard Deviation for total score.

Findings demonstrated that the (56.4%) of pregnant women exhibited a poor level of anemia preventive behavior as described by low average which equal to 20.45 (±8.70).
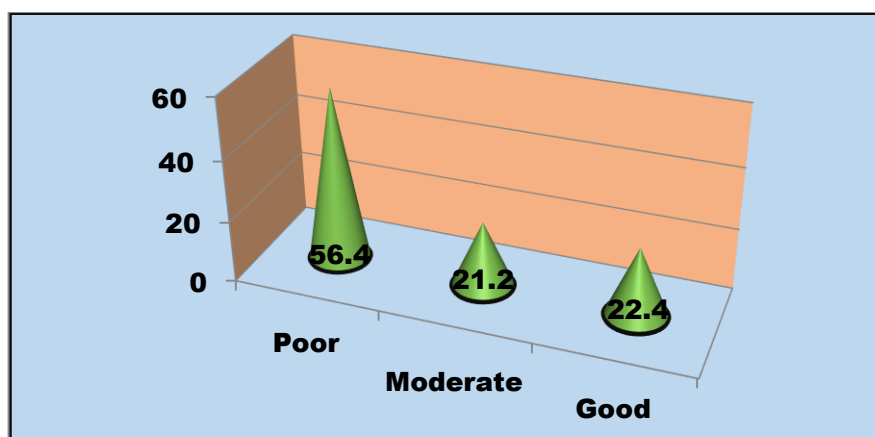
Figure 4-3. Pregnant Women Preventive Behavior towards Anemia

Table 4.6.Correlation between Awareness and Health Beliefs with Prevention Behavior of Anemia

Correlation Coefficient	1	2	3
1.Awareness	-	.436**	.370**
2.Health Beliefs	.436**	-	.279**
3.Preventive Behavior	.370**	.279**	-

Findings exhibit the preventive behavior of anemia among pregnant women is significantly correlated (positive) with awareness towards anemia (*r=0.370; p<0.01*) and health beliefs towards anemia (*r=0.279; p<0.01*).
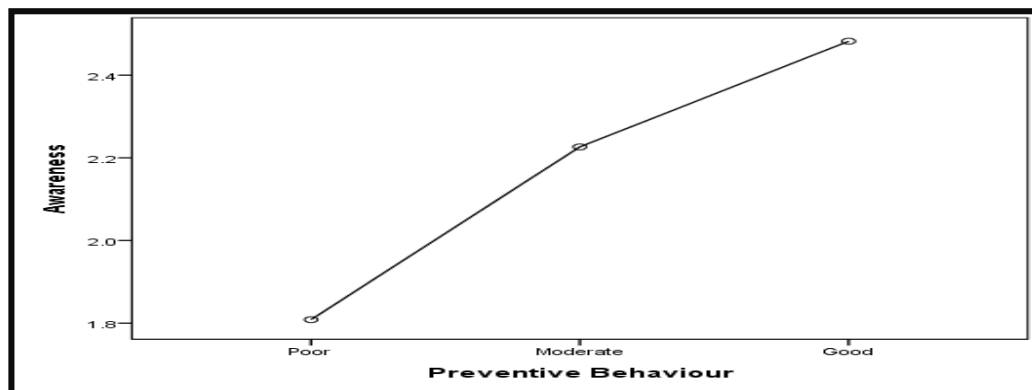
Figure 4-4.Distribution of Prevention Behavior according to Awareness of Anemia.

Figure 4-5.Distribution of Prevention Behavior according to Health Beliefs of Anemia

4.7. Significant Differences in Preventive Behavior of Pregnant Women with regard their Socio-Demographic Variables

Table 4-7-1: Statistical Differences in Preventive Behavior with regards Pregnant Age (*n=250*)

Age groups	Source of variance	Sum of Squares	d.f	Mean Square	*F-statistic*	*P-value*
Prevention Behavior	Between Groups	14.695	3	4.898		
	Within Groups	97.140	246	.395	12.404	.001
	Total	111.834	249			

.Results showed that there were significant variations in anemia prevention behavior according to the age of pregnant women (p=0.001).
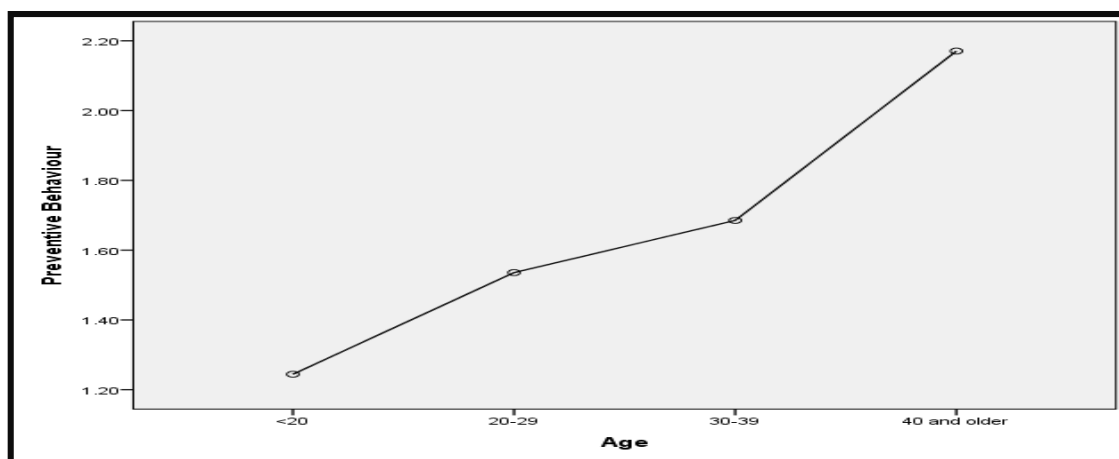
Figure 4-6.Distribution of Preventive Behavior according to Age Groups.

Table 4-7-2: Statistical Differences in Preventive Behavior with regards Pregnant Education (*n=250*)

Education Level	Source of variance	Sum of Squares	d.f	Mean Square	*F- statistic*	*P- value*
Prevention Behavior	Between Groups	18.571	4	4.643		
	Within Groups	93.264	245	.381	12.196	.001
	Total	111.834	249			

The results showed that there were significantly variations in the prevention behavior of anemia depending on the educational status of pregnant women (p=0.001).

Figure 4-7.Distribution of Prevention Behavior according to Education Level.

Table 4-7-3: Statistical Differences in Preventive Behavior with regards Pregnant Occupation (*n=250*)

Occupation	"Source of the variation"	Total Squares	d.f	Square mean	F-statistic	P-value
Preventive Behavior	Between "Groups"	.198	2	.099	.219	.803
	"Within Group"	111.636	247	.452		
	Total	111.834	249			

.The results show there were no substantial variance in preventive behavior of anemia with regards pregnant women occupation "(*p=0.803*)".

Table 4-7-4: Statistical Differences in Preventive Behavior with regards Pregnant Monthly Income (*n=250*)

Income	Source of variation	Total square	d.f	Square mean	F-statistic	P-value
Prevention Behavior	"Between Groups"	9.342	2	4.671	11.256	.002
	Within Groups	102.493	247	.415		
	Total	111.834	249			

.The results show substantial variation in preventive behavior of anemia with regards

 Pregnant women monthly income (*p=0.002*).
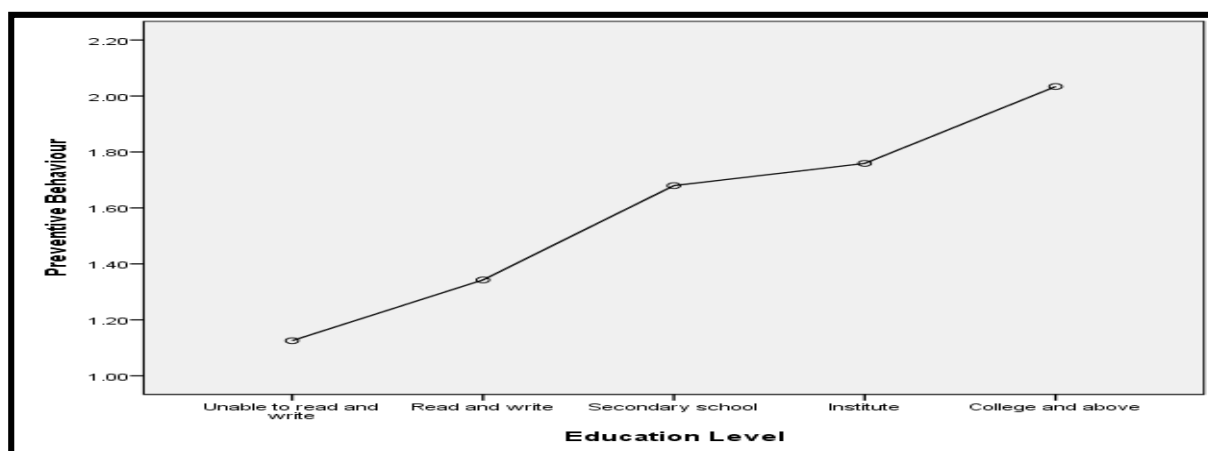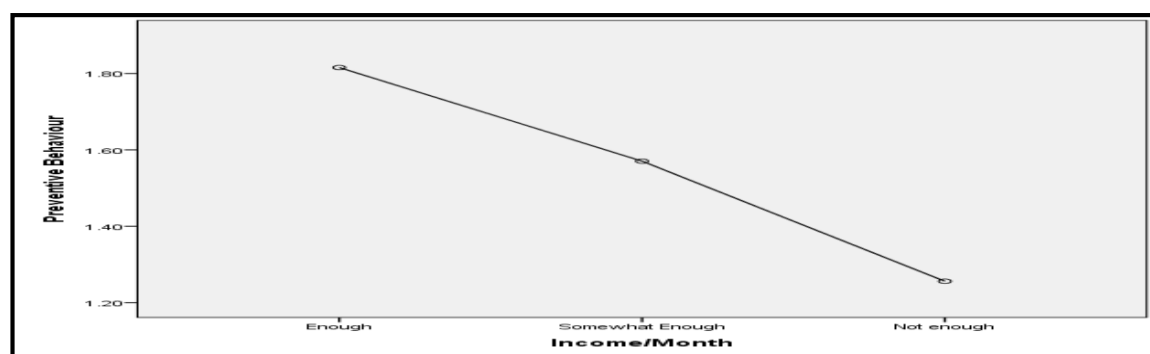

Figure 4-8.Distribution of Prevention Behavior according to Monthly Income

Table 4-7-5: Statistical Differences in Prevention Behavior with regards Pregnant Type of Family (*n=250*).

Variables	Type	Mean	SD	t-value	d.f	P-value
Prevention Behavior	Nuclear	1.5830	.68087	.215	248	.830
	Extended	1.5647	.66252			

The results show no substantial variation in preventive behavior of anemia regarding pregnant women type of family "*p=0.830*".

Table 4-7-6 Statistical Disparities in Preventive Behavior toward Residents Who are Pregnant (n=250.)

Variables	Residents	Mean	SD	t-value	d.f	*P-value*
Prevention	Urban	1.5570	.66258	.734	248	*.464*
Behavior	Rural	1.6322	.69950			

The results show there is no substantial variation in preventive behavior of anemia with regards pregnant women residents (*p=0.464*).

Table 4-7-7: Statistical Differences in Preventive Behavior with regards Pregnant History of Anemia (*n=250*)

Variables	History	Mean	SD	t-value	d.f	*P-value*
Prevention	Yes	1.5943	.66900	.822	248	*.412*
Behavior	No	1.5136	.66154			

The results show there is no substantial variation in preventive behavior of anemia with regards to pregnant women's history of anemia "*p=0.412*".

"Table 4-7-8:Statistical Differences in Preventive Behavior with regards Pregnant Sources of Information (*n=250*).

Information source	cause of variance	Total Square	"d.f"	Mean Square	*F-statistic*	*P-value*
Prevention	Between Groups	4.998	3	1.666	3.836	.010
Behavior	Within Groups	106.837	246	.434		
	Total	111.834	249			

.Informational sources showed that there were considerable variations in anemia prevention behavior for pregnant women (*p=0.010*).
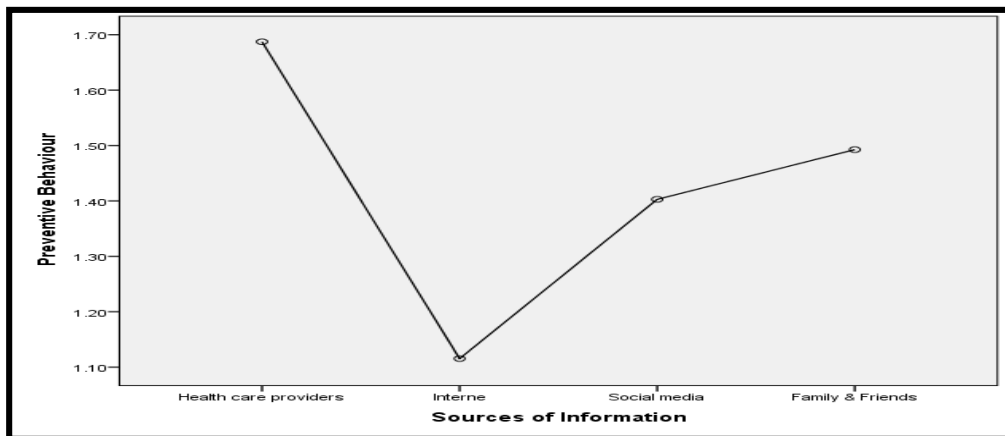
Figure 4-9.Distribution of Prevention Behavior according to Sources of Information

Chapter Five

Discussion of Study Results

Chapter Five

In this section, an explanation of the results of the study related to the objectives that have been set is discussed and given:

5.1 Characteristics of the Study Sample

The average age of participants was 26 (±7.13), with the biggest percentage (44.4%) being within the 20-to-29 age range. due to the fact that this age group is regarded as the age of output. This research supports the findings of Appiah et al. (2020), who showed that pregnant women between 20 to 29 years are the most favorable age range for pregnancy. Ademuyiwa et al (2020) found that respondents were between 26 and 30 with a mean age of 28.18 0.84 years, which is comparable with Duko et al. (2017).

Relative to education, the majority of participants (31.6%) had completed secondary school, which is regarded as an average educational level in terms of their familiarity with anemia. Nelofar et al (2018), findings showed that the majority of participants were urban inhabitants, were uneducated (illiterate), and that there were variations amongst them.

Because of the correlation between education and employment prospects, the majority of the population in the study was comprised of stay-at-home mothers (73.6%). According to this survey, the unemployment rate is comparable to that seen in studies conducted in Southern Ghana, Kenya, and South Africa (Muzigaba et al., 2014; Dako-Gyeke & Kofie, 2015).

Concerning monthly income related findings, half of study sample were somewhat enough income (51.2%) due to monthly income accompanies the occupation, as most of the study sample are housewives, so they do not receive enough monthly income.

Family type-related findings, most families were extended (51.6%). Residents associated results; the urban residents were record highest percentage (78%) because the hospital included study were located in urban area, in terms of the history of anemia, more than half of the study sample had a history of anemia. Sources of information associated with findings, pregnant women use health care provides to gain information related anemia prevention.

In terms of frequencies and percentage, out of 250 pregnant women participated in current study showed (64.4%) Gravida in 4-5 time, (78%) were 1-3 Para, (74%) absent abortion and (76%) at the time of data collection at third trimester.

This finding is consistent with research on prenatal women conducted in South India, which showed that most of the women who participated in the research were housewives and belonged to lower socioeconomic classes. Only one-fifth of the women who took part in the study and lived in a nuclear family was illiterate, and the majority of them had only a basic level of education. Multi-pregnant ladies in their third trimester made up most of the prenatal population. Their treating physician was the most frequent source of their information (Thapar et al., 2021).

5.2. Pregnant Women Awareness towards Anemia

Findings demonstrated that the (40.8%) of pregnant women exhibited a moderate awareness towards anemia as described by moderate average which equal to 37.08 (±*11.61*) (table 4-3-2). These results are consistent with those from southern Iraq's Al-Amara City, where the majority of expectant mothers had a moderate awareness of anemia. This result may be attributable to a lack of education because the majority attended primary schools or to a lack of experience because the majority were in their first or second pregnancies (AlAbed et al., 2020).

These results concur with those of Thapar et al. (2021), who found that the majority of pregnant women were only moderately aware of anemia since their educational background did not allow them to do so. Additionally, a study in Libya that evaluated pregnant women's knowledge and awareness of anemia risk factors found that all of the women had a moderate understanding of anemia (Ratanasiri & Koju, 2014). Once more, a study from Ghana's Brosankro region found that 30% of pregnant women were only partially aware of the symptoms and signs of anemia (Dwumfour-Asare & Kwapong, 2013). Appiah et al. (2020) found that in the Western-north region of Ghana, most pregnant women were only partially aware of anemia due to their awareness of anemia and adherence to anemia preventative strategies.

Due to the research population being primarily illiterate (informal educated) and the fact that the mass media played a significant role in spreading awareness, the current study's findings are greater than those from the District of Srinagar in India (94.6%). Pregnant women need to be made aware of the symptoms, causes, prevention, and treatment of anemia in pregnancy (Nelofar et al., 2018). More than half of the sample (51.3%) had insufficient knowledge about anemia and its contributing variables, according to Ghimire and Pandey's (2013) research.

Current study findings is lower than findings from Nigeria Most of the women in this study were already aware of anemia (68. 90%), but more work has to be done to educate pregnant women about prevention of anemia and how to avoid them if they want to have healthy babies. (Ademuyiwa et al., 2020). Also in another study conducted in Ethiopia, the majority of participants had a complete awareness of anemia, as reported by Duko et al. (2017). Pregnant women visiting the Antenatal Clinic at Ifako-Ijaiye General Hospital in Lagos, Nigeria, were surveyed about their knowledge, attitudes, and practices regarding the prevention

of anemia in pregnancy. The vast majority (95%) of respondents were aware of anemia in pregnancy (Yesufu et al., 2013).

More education and sensitization measures, including proper nutritional practices in the diet of pregnant women, are advised to increase knowledge and adherence to anemia prevention techniques among pregnant women.

5.3. Pregnant Women Health Beliefs towards Anemia

Findings demonstrated that the (41.6%) of pregnant women exhibited a moderate health beliefs towards anemia as described by moderate average which equal to 58.73 (±*34.90*) (table 4-4-2). This research outperformed that of Egyptian women, who found that 67.7% of their opinions about health were unfavorable (Abd El Ghafar, 2022). The studies we conducted dealt with pregnant women, whereas Abd El Ghafar's study focused on students who weren't of childbearing age.

Health directors, decision-makers, and social media platforms offer educational seminars to change pregnant women's perceptions of anemia. These initiatives can change pregnant women's perceptions of anemia. Prior to education, there was no discernible change between the control and intervention groups' health beliefs and behaviors in an Iranian study. Three months after the course concluded, mean scores for perceived vulnerability, perceived advantages, perceived obstacles, perceived severity, perceived self-efficacy, signals to action, and performance varied significantly (Ghaderi et al., 2017). The HBM argues a primary needs assessment can increase the effectiveness of maternal interventions to avoid IDA. These interventions may replace more traditional kinds of education (Khorsandi et al., 2021).

5.4. Pregnant Woman Prevention Behavior toward Anemia

Lack of nutritional information and the ensuing poor use of this knowledge can lead to issues like malnutrition and non-contagious diseases, which is one of

the most significant causes of nutritional problems. Worldwide, more than two billion people suffer from anemia. According to the World Health Organization, 58% of expectant mothers in underdeveloped nations are anemic. Anemia during pregnancy can be fully avoided, though, if you are aware of how to prevent it and use the right techniques (Nakade et al., 2020).

Findings of current study demonstrated that the (56.4%) of pregnant women exhibited a poor level of anemia preventive behavior as described by low average which equal to 20.45 (±*8.70*) (table 4-5-2). The results of this study were somewhat better than those of a previous study carried out in a teaching hospital in Kathmandu, which found that only 34% of mothers had acceptable preventative behaviors for the prevention of anemia during pregnancy. This minor discrepancy can result from changes in study location and time period (Adam, 2016).

Researchers found that half of pregnant women getting ANC at West Shao Zone Governmental Hospitals did not take enough measures to reduce their risk of anemia. There are a variety of factors, such as level of education, place of residence, presence of a nuclear family structure, and prior anemia history, that have been demonstrated to significantly affect preventive behaviors related to anemia in pregnancy (Jayanthigopal & Demisie, 2018).

The high frequency of anemia in Bangladesh and other Asian countries implies it is a critical public-health problem that requires preventative efforts. A different study revealed 41.9% anemia prevalence in Ethiopia, a statistic identical to ours concerning inadequate preventive action. (Jufar & Zewde, 2014). Forty-0.92 percent, 54.54%, and 4.54% of 66 pregnant women in an Indian research had mild, moderate, and severe anemia, respectively (Sharma & Nagar, 2013).

Numerous factors, including the age of the mother, her level of education, her income, and the low number of pregnancies, may contribute to her lack of awareness of the hazards of anemia during pregnancy. Pregnant women require

more media and health facility management-led awareness campaigns. at the GMERS Medical College in Gandhinagar's department of obstetrics and gynecology. After our single teaching session, there was a noticeable improvement in the adherence to anemia therapy and related preventive measures among pregnant women (Nimbalkar et al., 2017).

5.5. Correlation between Awareness and Health Beliefs with Prevention Behavior of Anemia

Findings exhibit the preventive behavior of anemia among pregnant women is significantly correlated (positive) with awareness towards anemia ($r=0.370; p<0.01$) and health beliefs towards anemia ($r=0.279; p<0.01$) (table 4-6). Anemia prevention behavior increase in frequency and intensity as knowledge about the condition and associated assumptions about its effects grow. Pregnant women's adherence to measures to prevent anemia during pregnancy was highly correlated with their level of knowledge about the topic.This follows Mirzaei et al. (2017) and Abd El Ghafar (2022), who found an association between stated practice and health views.

Additionally, it has been discovered that good behavior for preventing anemia during pregnancy have a significant impact on participants' understanding of anemia prevention. These results are in line with those of an Indian study that indicated that insufficient anemia prevention methods raised the risk of anemia among pregnant women by a six fold, and that decreased awareness of anemia among pregnant women increased the risk of anemia by a fivefold (Nagraheni et al., 2003).

5.6. Demographic Characteristics Associated with Prevention Behavior among Pregnant Women

There were only pregnant age, education level, monthly income and sources of information as factors associated with their preventive behavior, which are discussed as the following:

5.6.1. Prevention Behavior of Anemia and Pregnant Women Age

Findings demonstrated that there were significant differences in preventive behavior of anemia with regard to pregnant women's age ($p=0.001$) (table 4-7-1). The significant differences were in favor of the older age groups (≥ 40 years), which recorded the highest average of preventive behavior, in contrast to the young age groups (<20 years), which recorded the lowest average of preventive behavior, meaning that the analysis of variance confirmed that the higher the age, the greater the awareness of the women in the practices of preventive behavior from anemia (Fig. 4-6).

These results are consistent with those of Tashara (2015), who found that pregnant women in younger age groups tend to have insufficient preventative anemia measures because they are less aware of the dangers associated with anemia. On the other hand, because they experience fewer pregnancies than older, young people are unaware of preventative strategies (Margwe & Lupindu et al., 2018). The age of the expectant mother must be taken into account by the Department of Health and decision-makers in the educational component.

5.6.2. Prevention Behavior and Pregnant Education Level

Findings demonstrated that there were significant differences in preventive behavior of anemia with regards to pregnant women's education level ($p=0.001$) (table 4-7-2). The differences favored those who graduated with a bachelor's degree, unlike those who did not educate (illiterate) (Fig. 4-7). That is, higher education is significantly associated with improved preventive behavior. So, the educational level is an influential and important factor in the preventive behavior of anemia, and the difference between an educated mother and an uneducated mother is great. This factor should be considered in improving preventive behavior practices in anemia.

This result is bolstered by the research of Chowdhury et al. (2015). They discovered a strong correlation between women's literacy and antenatal care service utilization and a link between education and population knowledge of health service utilization. Anemia prevention during pregnancy is influenced by both the number of births expected and the mother's level of education (Ghader et al., 2017). In the study of Abujilban et al. (2019), there was a substantial association (positive) between anemia prevention and degree of education, as being preventative behavior of anemia connected with education levels.

5.6.3. Prevention Behavior and Pregnant Women's Income/ Month

Analysis of variance confirmed that there were significant differences in preventive behavior of anemia with regard to pregnant women's monthly income ($p=0.002$) (table 4-7-4). Through the results, the economic situation or monthly income plays an important role in the preventive behavior of anemia, as pregnant women with sufficient monthly income were the best preventive behavior than those with an average and insufficient monthly income (Fig. 4-8).

This conclusion is corroborated by research in Dhaka city, which found that there were more anemic patients in the low-income group (n = 53) than in the high-income group (n = 6). That income was also related to maternal anemia (Chowdhury et al., 2015). Researchers in Pakistan found that patients whose monthly income was less than Rs 5,000 had hemoglobin levels that were 1 g/dL lower than those whose income was Rs 5,000 or higher (Ayub et al., 2009).

According to consistent findings, there is a favorable relationship between anemia prevention behavior and socioeconomic position (income), since individuals with sufficient monthly income may meet the dietary needs for anemia prevention (Xu et al., 2016).

5.6.4. Prevention Behavior and Pregnant Women Sources of Information

Findings demonstrated that there were significant differences in preventive behavior of anemia with regard to pregnant women's sources of information ($p=0.010$) (table 4-7-8). Almost (54.8%) of the study sample use health Institutions (health care providers) as a source of their information, and it is considered one of the best sources that provide them with consultations related to the prevention of anemia.

Contrarily, compared to pregnant women who visited health care providers, those who relied on the Internet for information on avoiding anemia had lower arithmetic mean in their preventative behaviors (Fig. 4-9). These findings corroborate those from Iraqi pregnant women and show a strong correlation between anemia prevention strategies and maternal knowledge of health risks (AlAbedi et al., 2020).

The results showed that the scores of awareness of respondents were *37.08*, the health beliefs were *58.73* and preventive behavior was *20.45*. Statistical significance correlation (positive) was found between awareness of anemia and preventive behavior "$r=0.370; p=0.000$"; and between health beliefs and preventive behavior of anemia ($r=0.279; p<0.01$). The study adds knowledge regarding health education for all segments of society regarding anemia and its associated factors. Further studies are needed to conduct an educational program to improve pregnant knowledge, awareness and practices with regards to anemia prevention.

Chapter Six

Conclusions
and
Recommendations

Chapter Six.

6.1. Conclusions

6.1.1. Pregnant women expressed a moderate level of awareness and health beliefs towards anemia.

6.1.2. Unsuccessful preventative behavior among pregnant women was influenced by the women's age, education, monthly income, and informational sources.

6.1.3. Anemia preventive behavior among pregnant women depends on their awareness and health beliefs behavior.

6.1.4. Anemia preventive behavior among pregnant women influenced by their age (older age is significantly improve preventive behavior).

6.1.5. Pregnant women's behavior to avoid anemia is influenced by their degree of education (higher education level associated higher preventive behavior).

6.1.6. Pregnancy-related anemia prevention behavior are substantially associated with monthly income (higher income associated increased preventive behavior).

6.1.7. Pregnant women's behavior to prevent anemia rely on the information they receive (health care provides considered a best sources of information towards anemia prevention).

6.2. Recommendations

6.2.1. A decrease in the prevalence of anemia is brought on by women's health awareness and beliefs. Therefore, pregnant women need intervention health programs based on health belief model in order to improve their awareness health.

6.2.2. Holding training sessions and seminars through health directorates and social media which indeed help to develop the preventive behavior of anemia among pregnant women.

6.2.3. Encourage the social media to cover issues relating to anemia and ways to prevent it.

6.2.4. Pregnant women and their families should get a manual handbook on anemia prevention and management that is written in plain language and attractively illustrated.

6.2.5. Additional research studies is required about the management and prevention of anemia during pregnancy.

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Appendices

Appendix A. Scientific Research Ethics.

inistry of Higher Education and Scientific Research niversity of Karbala / College of Nursing Scientific Research Ethics Committee	وزارة التعليم العالي والبحث العلمي جامعة كربلاء / كلية التمريض لجنة اخلاقيات البحث العلمي

استمارة اخلاقيات البحث العلمي

عنوان مشروع البحث

English	باللغة العربية
The relationship between Awareness and Health Beliefs with Anemia Prevention Behavior of Pregnant Women.	العلاقة بين الوعي والمعتقدات الصحية مع سلوك الوقاية من فقر الدم لدى المرأة الحامل.

بيانات عن الباحث الرئيسي

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(Importance of the research and its objectives) اهمية موضوع البحث واهدافه

Anemia pregnancy (AIP) is a major health burden to the in global health . It is commonly associated with negative consequences for both mother and fetus health).

Objective of the research:

1. To assess the awareness, and health beliefs towards anemia among pregnant Women.
2. To assess the preventive behavior toward anemia among pregnant women.
3. To determine the association between awareness and health beliefs with anemia Preventive behavior of pregnant women.
4. Find out the differences in preventive behavior of anemia with pregnant women Socio-demographic characteristics.

Time and Setting of the Research وقت ومكان اجراء البحث (الاماكن المقترحة لأجراء البحث فيها)

- The study Start from 1 / · / 2021 to1 / Nov / 2022.

In Obstetrics and Gynecology Teaching Hospital in Holy Kerbela city.

(Methodology) منهجية البحث

Quantitative Descriptive Correlation Study.

Sample of the study عينة الدراسة

250 Pregnant women who attend Obstetrics and Gynecology Teaching Hospital in Holy Kerbela city.

(Ethical consideration during research) الاعتبارات الاخلاقية خلال اجراء البحث

التعهد

اني الموقف ادناه رشا حسين عليوي نهابه اتعهد بان اقوم باجراء البحث وفقا لما ذكر في اليروتوكول اعلاه وان التزم باتباع القوانين والتعليمات فيما يخص اجراء البحوث والالتزام باخلاقياتها ، كما واتعهد باخذ الموافقة من افراد العينة للمشاركة في الدراسة واخذ موافقة من ولي أمر المشارك الشرعي في حال كون عمر الشخص المشارك اقل من 18 سنة، او كونه غير قادر على الفهم ، وان اقدم الإيضاحات و المعلومات الخاصة بالدراسة لأفراد العينة للمشاركين في حال طلبها. وان اتعامل بسرية تامة مع بيانات افراد العينة.

اسم وتوقيع الباحث
رشا حسين عليوي نهابه

توصية لجنة اخلاقيات البحوث في الكلية

نحن اعضاء اللجنة الاخلاقية نوصي بان موضوع الباحث : ذو قيمة علمية ومهم للمجتمع والمريض

عضو	عضو	عضو	عضو	عضو
رئيس اللجنة				

Appendix B. Administrative Agreements.

Holy Karbala governorate
Karbala Health Department
General manager's office
Training and Human Development
Center

جمهورية العراق

محافظة كربلاء المقدسة
دائرة صحة كربلاء المقدسة
مركز التدريب والتنمية البشرية
شعبة ادارة المعرفة
وحدة البحوث

مديرية م. النسائية والتوليد التعليمي
في كربلاء المقدسة

العدد: ٦٥
التاريخ: ١٧/٧ ٢٠٢٢

١١٩٨
٢٠/ ٤/ ٢٠٢٢

إلى / جامعة كربلاء / كلية التمريض/شعبة الدراسات العليا

الموضوع /تسهيل مهمة

تحيه طيبه.....

كتابكم المرقم ٢٩ في ٢٠٢٢/٢/٤

نود إعلامكم بأنه لا مانع لدينا من تسهيل مهمة الطالبة (رشا حسين عليوي) دراسات عليا لإنجاز بحثها الموسوم حول: (The Relationship between Awareness and Health Beliefs with Anemia prevention Behavior of pregnant women)في مؤسساتنا الصحية/ مستشفى النسائية والتوليد التعليمي في مدينة كربلاء المقدسة. وبأشراف الدكتورة (حميدة هادي عبد الواحد) على ان لا تتحمل دائرتنا اي نفقات مادية مع الاحترام .

الدكتور
نعيم عبيد المشهداني
طبيب
الدكتورة
تقوى خضر عبد الكريم
مدير مركز التدريب والتنمية البشرية
٢٠٢٢/ك /

نسخة منه الى
مستشفى النسائية والتوليد التعليمي. لاجراء اللازم مع الاحترام .٠
مركز التدريب والتنمية البشرية مع الأوليات/ شعبة ادارة المعرفة/ وحدة البحوث مع الاوليات
حيدر /

Appendix B. Administrative Agreements.

<div dir="rtl">

وزارة الصحة

دائرة صحة كربلاء

مركز التدريب والتنمية البشرية

لجنة البحوث

استمارة رقم ٢٠٢١/٠٣

رقم القرار ٢٨

تاريخ القرار ٢٠٢٢/٢/١٧
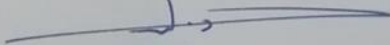
قرار لجنة البحوث

درست لجنة البحوث في دائرة صحة كربلاء مشروع البحث ذي الرقم (٢٠٢٢.٣٧/كربلاء) المعنون:

</div>

The Relationship between Awareness and Health Beliefs with Anemia prevention
Behavior of pregnant women

<div dir="rtl">

والمقدم من الباحثين **رشــــا حسين** عليوي الى وحدة ادارة البحوث والمعرفة في مركز التدريب والتنمية البشرية في دائرة صحة كربلاء بتاريخ ٢٠٢٢/٢/٤ وقررت:

قبول مشروع **البحث** اعلاه كونه مستوفيا للمعايير المعتمدة في وزارة الصحة والخاصة بتنفيذ البحوث ولا مانع من تنفيذه في مؤسسات الدائرة.

الدكتــور

نعيم عبيد المشهداني

طبيب اختصاص

مقرّر لجنة البحوث

17/02/2022

المرفقات:

ملاحظات:

- تم تخويل عضو لجنة البحوث (د.تقوى خضر عبد الكريم) او مقرر اللجنة (د.نعيم عبيد طلال) للتوقيع على هذا القرار استنادا الى النظام الداخلي للجنة البحوث.

- الموافقة تعني ان مشروع البحث قد استوفى المعايير الاخلاقية والعلمية لاجراء البحث والمعتمدة في وزارة الصحة ...

</div>

Appendix C. Questionnaire.

جامعة كربلاء ـ كلية التمريض

فرع تمريض صحة الأم والوليد.

م / أستبانة رسالة ماجستير.

تحية طيبة لحضراتكم .....

يطيب لي أن اضع بين ايديكم هذا الأستبيان الذي هو جزء من بحث اكاديمي (رسالة ماجستير) بهدف الحصول على معلومات تتعلق بدراسة عنوانها **(العلاقة بين الوعي والمعتقدات الصحية تجاه سلوك الوقاية من فقر الدم لدى النساء الحوامل)**. لذلك أرجو التكرم بتخصيص جزء من وقتكم لتعبئة هذه الاستمارة مع مراعاة الدقة في ألاجابة. **علما ان جميع المعلومات الت ي ستدون من قبلكم ستبقى سرية و سوف تستخدم لاغراض البحث العلمي فقط** . شاكرين تعاونكم معنا .

تقبلو فائق ألاحترام.

<u>الجزء الأول:</u>

ا. المعلومات الاجتماعية والديموغرافية:

1. العمر: ☐

2. مستوى التعليم:
- لاتقرا ولاتكتب. ☐   تقرا وتكتب ☐
- خريجة الدراسة الإبتدائية. ☐   خريجة الدراسة الثانوية. ☐
- خريجة معهد. ☐   كلية فما فوق. ☐

2. المهنة:
- طالبة. ☐   تعمل . ☐   ربة بيت. ☐
-

4. الوضع الاقتصادي (مستوى الدخل) :
- يكفي. ☐   يكفي الى حد ما. ☐   لايكفي. ☐

5. نوع الأسرة:
- اسرة نووية (مكونة من زوجك واولادكما فقط) ☐   أسرة ممتدة. (مكونة من زوجك , اولادكم ,بقيةافراد اسرة زوجك) ☐

6. مكان الاقامة:
- مدينة. ☐   ريف. ☐

7. تاريخ الاصابة بفقر الدم:
- مصابة سابقا. ☐   لم يسبق لك الاصابة. ☐

8. مصادر معلوماتك حول فقر الدم:
- مقدمي الرعاية الصحية. ☐   وسائل الاعلام. ☐
- الانترنيت . ☐   مصادر اخرى ☐

ب: <u>معلومات انجابية:</u>

1. عدد مرات الحمل:
- مرة واحدة ☐   2-4 . ☐   5 فمافوق ☐

2. عدد مرات الولادة:
- 1-3 ولادة. ☐   4 فمافوق. ☐

3. عدد مرات الاجهاض:
- توجد. ☐   لا توجد. ☐

2. عمر الحمل:
- الثلث الاول من الحمل(1-3) شهر ☐   الثالث الثاني من الحمل(4-6) شهر . ☐
  الثلث الثالث من الحمل(7-9) شهر ☐

الجزء الثاني: وعي المرأة الحامل تجاه مرض فقر الدم:

غير صحيح.	غير متأكد.	صحيح.	العبارات	
			أن فقر الدم يعني انخفاض تركيز كريات الدم الحمراء أو مستوى الهيموجلوبين في الدم.	1.
			يمكن أن يؤدي سوء التغذية الى حدوث فقر الدم.	2.
			يعد الحمل المتكرر خلال فترة أقل من سنتين عامل خطرا للإصابة بفقر الدم أثناء الحمل.	3.
			يمكن أن يتسبب تاريخ فقدان الدم الغزير بسبب الدورة الشهرية في الإصابة بفقر الدم.	4.
			من أعراض فقر الدم ضيق التنفس,خفقان القلب وألم الصدر.	5.
			يعاني مرضى فقر الدم عادة من التعب والإرهاق.	6.
			الدوار والصداع من علامات فقر الدم.	7.
			شحوب الجلد, وبياض الأظافر من علامات فقر الدم.	8.
			يمكن أن يؤثر فقر الدم على صحة المرأة الحامل والجنين.	9.
			يمكن ان يؤدي فقر الدم الى ولادة اطفال ذوي وزن منخفض.	10.
			يمكن أن يؤدي فقر الدم الى حدوث الولادة المبكرة.	11.
			يمكن أن يسبب فقر الدم زيادة النزيف خلال الولادة وعدوى النفاس.	12.
			يعد الالتزام بمكملات حبوب الحديد جنبًا إلى جنب مع النظام الغذائي السليم أمرًا ضروريًا أثناء الحمل.	13.
			يمكن تناول أقراص الحديد مع عصير البرتقال.	14.
			يمكن تناول أقراص الحديد مع الحليب أو مشتقاته.	15.
			يمكن للنظام الغذائي الغني بالحديد ،البروتين وفيتامين c أن يحمي النساء الحوامل من الإصابة بفقر الدم.	16.
			تعد اللحوم، الكبد والخضروات الخضراء مصادر غنية بالحديد.	17.
			تعد البقوليات والبيض مصادر غنية بالبروتين.	18.
			تعد ثمار الحمضيات مصادر غنية بفيتامين سي.	19.

الجزء الثالث : المعتقدات الصحية للمراة الحامل تجاه مرض فقر الدم

لا اتفق بشدة	لا اتفق	محايد	اتفق	اتفق بشدة	1- أدراك القابلية.	
					ان بعض حالات الحمل تهيئ لفقر الدم.	1
					أعتقد أن نسبة فقر الدم أثناء الحمل مرتفعة.	2
					لأن تغذيتي جيدة ، لا أحتاج إلى تناول المكملات.	3
					قد أعاني من فقر الدم ولكن لا توجد أعراض.	4
					2. أدراك الخطورة.	
					اشعر بالقلق من عدم تناول المكملات الموصى بها أثناء الحمل.	1.
					ان فقر الدم أثناء الحمل يمكن أن يعرض صحة المرأة الحامل للخطر.	2.
					أعتقد أن فقر الدم أثناء الحمل يمكن أن يؤثر في نمو جنيني.	3.
					يمكن أن يؤدي عدم تناول حبوب حمض الفوليك إلى ولادة طفلي بشكل غير طبيعي.	4.
					أعتقد أن فقر الدم أثناء الحمل يمكن أن يزيد من معدل مضاعفات ما بعد الولادة.	5.
					3.ادراك الفوائد .	
					إذا كنت أتناول حمض الفوليك خلال ثلاثة أشهر الاولى من الحمل ، فإن فرص إصابة طفلي بعيب خلقي في الأنبوب العصبي تقل بشكل كبير.	1.
					ان تناول الأطعمة التي تحتوي على الحديد وحمض الفوليك يقلل من مضاعفات ما بعد الولادة.	2.
					إن تناول المكملات الغذائية وحمض الفوليك يعزز من صحة المراة الحامل.	3.
					يقلل تناول الأطعمة التي تحتوي على الحديد وحمض الفوليك (مثل الكبد والعدس والخضروات وما إلى ذلك) من مضاعفات ما بعد الولادة.	4.
					استهلاك الأطعمة التي تحتوي على فيتامينات أ ، ب 12 ، ب 2 يقلل من الإصابة بفقر الدم.	5.
					3.ادراك العوائق.	
					اتجنب تناول حبوب الحديد لأنني أخاف من حدوث مضاعفات (غثيان وقيء ، إمساك).	1.
					يصعب علي تناول المكملات الغذائية بانتظام بسبب الوضع الاقتصادي السيئ.	2.
					بسبب الوضع الاقتصادي السيئ ، يصعب علي تناول الأطعمة التي تحتوي على الحديد (اللحوم والبقوليات).	3.
					لا أقوم بإجراء فحوصات فقر الدم بسبب ارتفاع التكاليف.	4.
					لا أعرف الطريقة الصحيحة لتناول المكملات.	5.
					لا أعرف كيف أتعامل مع الآثار الجانبية لحبوب فقر الدم.	6.
					1. ادراك الكفاءة الذاتية.	
					على الرغم من اهتمامي الكبير بالشاي ، يمكنني الامتناع عن تناوله بعد الأكل.	1.

					على الرغم من أن أقراص الحديد تسبب الغثيان ، يمكنني تناولها.	2.
					على الرغم من ارتفاع تكلفة اختبارات الكشف عن فقر الدم ولكن يمكنني اجرائها من اجل صحتي.	3.
					على الرغم من اني ، شخص كثير النسيان ، لكن يمكنني تناول أقراص الحديد وحمض الفوليك بانتظام من أجل صحتي.	4.
					بسبب وضعي الاقتصادي السيئ ، يمكنني استبدال اللحم بالبيض والفاصوليا وتناولها بانتظام.	5.
					ذا أردت ، يمكنني الحصول على المعلومات الصحية الصحيحة حول فقر الدم والوقاية منه.	6.
					6.ادراك الحافز الصحي.	
					تؤدي رؤية أو سماع حالة فقر الدم أثناء الحمل إلى الاستخدام السليم لمكملات الحديد والأطعمة	1.
					يؤدي الخوف من فقر الدم إلى الاستهلاك السليم لمكملات الحديد والأطعمة	2.
					يشجعني زوجي على تناول الأطعمة والمكملات الغذائية التي تساعد في الوقاية من فقر الدم اثناء الحمل.	3.
					الخوف من ضرر فقر الدم على وصحة جنيني يجعلني تناول مكملات فقر الدم والأطعمة المناسبة.	4.

الجزء الرابع: سلوك الوقاية من فقر الدم لدى المراة الحامل.

ابدا	أحيانا	دائما	العبارات	
			أتناول الأطعمة التي تحتوي على الحديد مثل اللحوم والأسماك بانتظام.	1.
			أتناول الأطعمة التي تحتوي على البروتينات مثل السمك والبيض والدجاج.	2.
			أتناول الخضار الورقية في كل وجبة مثل السبانخ واللفت والسلق الأخضر.	3.
			أتناول الأطعمة التي تحتوي على فيتامين سي مثل والبرتقال والليمون والطماطم.	4.
			أتناول البقوليات الحمص والعدس والفاصوليا.	5.
			أتناول أطعمة غنية بفيتامين A مثل الكبد والبرتقال والجزر.	6.
			أتناول الأطعمة التي أحبها بغض النظر عن محتواها الغذائي.	7.
			أشرب الشاي أو القهوة مباشرة بعد الأكل.	8.
			أتناول منتجات الألبان مع وجبات الطعام في نفس الوقت.	9.
			أتناول حبوب مكملات فقر الدم بانتظام وبحسب الجرعة الموصى بها.	10.
			أتناول حبوب الحديد مع عصير البرتقال.	11.
			اراجع مراكز الرعاية الصحية الاولية بأنتظام خلال فترة الحمل.	12.
			اقوم بأجراء فحوصات فقر الدم أنتظام خلال فترة الحمل.	13.

Appendix C. Questionnaire.

Part I:

A.Socio-demographic Information:

1. Age: ☐
2. Education level:

      Unable to read and write. ☐   Read and write. ☐

      Primary school ☐   Secondary school ☐

      Institute. ☐   College and above. ☐

3. Occupation:

      Student. ☐   Employed   Worker ☐   House wife ☐

4. Income/ month:

      Enough. ☐   Somewhat. Enough. ☐   Not enough. ☐

5. Family Type:

      Nuclear. ☐   Extended ☐
.
6. Residents:

      Urban ☐   Rural ☐

7. History of anemia:

      Yes ☐   No ☐

8. Sources of information about anemia:

      Health care providers. ☐   The media. ☐

      Social media Interne. ☐   Others. ☐

B. Obstetrical history:

1 Number of Pregnancy (Gravida):

      1. ☐   2-4. ☐   5 and above. ☐

2. Number of Birth (Para):

        1-3 ☐   4 and above. ☐

3. Number of Abortion:

        Present. ☐   Absent. ☐

2. Gestational Age:

    First trimester (1-3) months. ☐   Second trimester (4-6) month. ☐

        Third trimester) 7-9) months. ☐

Part II: Pregnant Awareness towards Anemia.

List	Items	Correct	Uncertain	Incorrect
1.	Anemia mean is a decrease in the concentration of red blood cell or hemoglobin level in the blood.			
2.	Malnutrition can cause anemia.			
3.	Repeated pregnancies at short intervals less than two years is risk factor for anemia in pregnancy.			
4.	History of heavy blood loss due to menstruation can cause anemia.			
5.	Shortness of breathing, heart palpitation and chest pain are symptoms of anemia.			
6.	Anemic patients normally experience fatigue and tiredness.			
7.	Dizziness and Headache are signs of anemia.			
8.	Paleness of skin and whitens of nails are a sign of anemia.			
9.	Anemia can affect the health of pregnant women and fetus.			
10.	Anemia could lead to low birth weight babies.			
11.	Anemia can cause preterm birth.			
12.	Anemia can cause increase obstetric hemorrhage.			
13.	Adherence to iron pill supplements along with proper diet is necessary during pregnancy.			
14.	Iron tablets can be taken be taken with orange juice.			
15.	Iron tablets can be taken be taken with milk or its derivatives.			
16.	Diet rich in iron, protein and vitamin c can protect pregnant women from getting anemia.			
17.	Meat, liver and green vegetables are rich source of iron.			
18.	Legumes and egg are rich sources of protein.			
19.	Citrus fruits are rich sources of vitamin C.			

Constructed related previous literature.

Part III: Pregnant Health Beliefs towards Anemia.

List	Perceived Susceptibility	Strongly Agree.	Agree.	Neutral.	Disagree	Strongly Disagree.
1	Certain conditions of pregnancy predispose to anemia.					
2	I think the rate of anemia in pregnancy is high.					
3	Because my nutrition is good, I do not need to take supplements (pills).					
4	I may have anemia but no symptoms.					
List	Perceived Severity					
5.	I'm worried about not taking the recommended supplements during pregnancy.					
6.	In my opinion, anemia in pregnancy can endanger the health of a pregnant woman.					
7.	I think anemia in pregnancy can cause insufficient fetal growth.					
8.	Not taking folic acid pills can cause an abnormal baby to be born.					
9.	I think anemia in pregnancy can increase the rate of postpartum complications.					
List	Perceived Benefits					
10.	If I take folic acid from during first three months of pregnancy, the chances of my baby having a congenital neural tube defect are greatly reduced.					
11.	Consumption of foods containing iron and folic acid reduce postpartum complications.					
12.	Taking supplements and folic acid promotes the health of pregnant women.					
13.	Consumption of foods containing iron and folic acid (such as liver, lentils, vegetables, heart, kidney, etc.) reduces postpartum complications.					
14.	Consumption of foods containing vitamin A, B12, B2, reduces the incidence of anemia.					
List	Perceived Barriers.					
15.	I do not take iron pills because I am afraid of complications (nausea and vomiting، constipation).					
16.	It is difficult for me to take supplements regularly due to the bad economic situation.					

	Due to the poor economic situation, it is difficult for me to consume foods containing iron (meat, legumes).					
17.	Due to high costs, I do not do anemia tests.					
18.	I do not know the correct way to take the supplements.					
19.	I do not know to deal with the side effects of pills.					
List	**Perceived Self-Efficacy.**					
20.	Despite my great interest in tea, I can refrain from eating it after a meal.					
21.	Although iron tablets cause nausea، I can take them.					
22.	Despite the high cost of the laboratory, I can have anemia tests to keep myself healthy.					
23.	Considering that I am a forgetful person, I can take iron and folic acid pills regularly for my health.					
24.	Due to my poor economic situation، I can substitute eggs and legumes for meat and eat them regularly.					
25.	If I want، I can get the right health information about anemia and its prevention.					
List	**Cues to Action.**					
26.	Seeing or hearing about the state of anemia in pregnancy leads to the proper use of iron supplements and foods.					
27.	Fear of anemia leads to proper consumption of iron supplements and foods.					
28.	My husband encourages me to eat the right foods and supplements.					
29.	Fear of harming my fetus causes me to take iron supplements and foods.					

Adopted and developed by Baharzadeh et al. (2017).

Part IV: Pregnant Prevention Behavior of Anemia.

List	Items	Always	Sometimes	Never.
1.	I eat foods rich in iron such as red meat and fish.			
2.	I eat foods rich in protein such as (chicken, fish and eggs).			
3.	I eat green vegetables at every meal such as spinach, greens chard.			
4.	I eat foods rich in vitamin C such as every meal such as such as orange, lemon and tomato.			
5.	I eat legumes (chickpeas, lentils and beans).			
7.	I eat foods rich in vitamin A such as (liver, orange and carrots).			
8.	I eat the foods I love regardless of their nutritional content.			
8.	I drink tea or coffee immediately after eating.			
9.	I drink dairy products with meals at the same time			
10.	I take anemia supplement pills regularly and according to the recommended dosage.			
11.	I visit primary health care centers regularly during pregnancy.			
12.	I get regular tests for anemia during pregnancy.			

Constructed related previous literature.

Appendix D. List of Experts.

ت	اسم الخبير	اللقب العلمي	مكان العمل	الاختصاص	سنوات الخدمة
خبراء تحكيم استمارة الاستبانة.
1	د. علي كريم خضير	استاذ	جامعة كربلاء/كلية التمريض	تمريض الصحية العقلية.	30
2	د. سلمان حسين فارس	استاذ مساعد	جامعة كربلاء/كلية التمريض	تمريض صحة المجتمع.	30
3	د. حسن عبدالله عذبي	استاذ مساعد	جامعة كربلاء/كلية التمريض	تمريض البالغين.	19
4	د. اخلاص علي حسين	استاذ مساعد	كلية الطب/ الجامعة العراقية.	طب نسائية وتوليد.	18
5	د. هديل رشيد صكر	دكتوراه تمريض صحة الام والوليد	معهد الصحة العالي/ كربلاء المقدسة.	تمريض صحة الام والوليد.	16
6	د. منار مجيد حميد	دكتوراه تمريض صحة الام والوليد	معهد الصحة العالي/ كربلاء المقدسة.	تمريض صحة الام والوليد.	14
7	د.بتول عبد زيد السلطاني	استشارية نسائية وتوليد.	دائرة صحة كربلاء/ مستشفى النسائية والتوليد التعليمي في كربلاء.	استشارية نسائية وتوليد.	22
8	د. حميدة هادي عبد الواحد	استشارية نسائية وتوليد.	دائرة صحة كربلاء/ مستشفى النسائية والتوليد التعليمي في كربلاء.	استشارية نسائية وتوليد.	29
9	د. هديل فاضل جدوع	بورد امراض نسائية.	دائرة صحة كربلاء/ مستشفى النسائية والتوليد التعليمي في كربلاء.	اخصائية نسائية وتوليد.	11
10	د. زينب زهير مهدي	بورد طب باطني.	دائرة صحة كربلاء/ مستشفى النسائية والتوليد التعليمي في كربلاء.	بورد طب باطني.	13
11	د. ايات عبد الستار رشيد	بورد طب باطني.	دائرة صحة كربلاء/ مستشفى النسائية والتوليد التعليمي في كربلاء.	بورد طب باطني.	10
12	د. حسن صالح عباس	دبلوم طب باطني.	دائرة صحة كربلاء/ مستشفى النسائية والتوليد التعليمي في كربلاء.	دبلوم طب باطني.	15

المستخلص

خلفية الدراسة: هناك معدل مرتفع من فقر الدم في البلدان المتخلفة مما يؤدي إلى زيادة معدلات الاعتلال والوفيات بين الأمهات وحديثي الولادة. جميع النساء الحوامل معرضات لخطر الإصابة بفقر الدم. هذا لأنهم يحتاجون إلى مزيد من الاهتمام من حيث الوقاية من فقر الدم أكثر من المعتاد. لذلك الدراسة تهدف إلى تقييم وعي المرأة الحامل ومعتقداتها الصحية وعلاقتهما بالسلوك الوقائي.

منهجية الدراسة: أجريت دراسة وصفية ارتباطية على عينة مكونة من 250 امرأة حامل في مستشفى النسائية والتوليد التعليمي في مدينة كربلاء المقدسة للفترة من 25 فبراير 5 نيسان 2022. تم التحقيق من مصداقية الاستبيان من خلال تقديمه للخبراء لإثبات موثوقيته و صحته. جمعت البيانات باستخدام تقنيات المقابلة وحللت من خلال تطبيق منهج تحليل البيانات الإحصائية الوصفي والاستدلالي.

النتائج: أشارت نتائج الدراسة إلى أن (40.8٪) من النساء الحوامل أظهرن مستوى معتدل من الوعي، (41.6٪)لديهن معتقدات صحية معتدلة و (56.4٪) كان لديهن سلوك وقائي ضعيف. كما اشارت النتائج الى ارتباط السلوك الوقائي لفقر الدم بين النساء الحوامل بشكل إيجابي بالوعي تجاه فقر الدم (0.370 = r ؛ p = 0.00) ومع المعتقدات الصحية تجاه فقر الدم (0.279 = r ؛ 0.00 = p). كانت هناك فروق ذات دلالة إحصائية في السلوك الوقائي فيما يتعلق بعمر المراة (p=0.001)، والمستوى التعليمي (p=0.001)، والدخل الشهري (p=0.002) ومصادر المعلومات اتجاه فقر الدم (p=0.001).

الاستنتاجات والتوصيات: يعتمد السلوك الوقائي لفقر الدم لدى الحوامل على وعيهن ومعتقداتهن الصحية. يحدث انخفاض في انتشار فقر الدم بسبب الوعي الصحي للمرأة والمعتقدات الصحية. لذلك، تحتاج المرأة الحامل الى برامج توعية صحية عبر وسائل التواصل الاجتماعي من أجل تحسين سلوكها الوقائي.
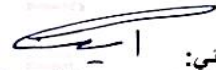
اقرار الخبير الاحصائي

اشهد بان الرسالة الموسومة :

باللغة الانكليزية:

(The Relationship between Awareness and health Beliefs with
Anemia Preventive Behavior of Pregnant Women) .

باللغة العربية :
العلاقة بين الوعي والمعتقدات الصحية مع سلوك الوقاية مع فقر الدم لدى النساء الحوامل.

قد تم الاطلاع على الاسلوب الاحصائي المتبع في تحليل البيانات واظهار النتائج الاحصائية
وفق مضمون الدراسة ولأجله وقعت.

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التاريخ: ٧/١ ٥ / ٢٠٢٢

<u>اقرار الخبير اللغوي</u>

اشهد بان الرسالة الموسومة :

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(The Relationship between Awareness and health Beliefs with Anemia Preventive Behavior of Pregnant Women) .

باللغة العربية :

العلاقة بين الوعي والمعتقدات الصحية مع سلوك الوقاية مع فقر الدم لدى النساء الحوامل.

قد جرى مراجعتها من الناحية اللغوية بحيث اصبحت بأسلوب علمي سليم خال من الاخطاء اللغوية ولأجله وقعت.

توقيع الخبير اللغوي:
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مكان العمل: جامعة كربلاء / كلية التربية للعلوم الانسانية
التاريخ: ٨/٨/ 2022

جامعة كربلاء/كلية التمريض.

العلاقة بين الوعي والمعتقدات الصحية مع سلوك الوقاية من فقر الدم لدى النساء الحوامل

رسالة تقدمت بها

رشا حسين عليوي نهابه

الى مجلس كلية التمريض/ جامعة كربلاء جزء من متطلبات نيل درجة الماجستير في علوم التمريض

بإشراف

م.د. ساجدة سعدون عليوي.