

Prevalence of Anemia in Pregnant Women and Chronic Kidney Disease Patients

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ABSTRACT

Anemia is one of the most common nutritional deficiency disorder affecting the pregnant women in the developing countries. Anemia during pregnancy is commonly associated with poor pregnancy outcome and can result in complications that threaten life of the mother and fetus. Anemia is common complication in chronic kidney disease (CKD), and is associated with a reduced quality of life, and an increased morbidity and mortality. The mechanism involved in anemia associated to CKD are diverse and complex. They include a decrease in endogenous erythropoietin (EPO) production.

INTRODUCTION

Anemia is a condition in which hemoglobin concentration or RBC numbers are lower and insufficient to meet an individual's physiological needs. ⁽¹⁾Anemia is a condition which is due to a lack of enough healthy red blood cells to carry adequate oxygen to tissues.

Anemia can also be referred to as a low level of hemoglobin; it makes one feel tired and weak. There are many forms of anemia, each with its own cause. Anemia can be temporary or long term and can range from mild to severe. In most cases, anemia has more than one cause. ⁽²⁾

Causes of anemia

Anemia can occur due to a condition present at birth (congenital) or a condition one can develop (acquired). Anemia occurs when blood doesn't have enough red blood cells. This can happen if:

- The body doesn't make enough red blood cells
- Bleeding causes to lose red blood cells more quickly than they can be replaced
- The body destroys red blood cells

Table 1: Classification of anemia

Grade	severity	Hemoglobin level
0	Within normal limits	12.0-16.0 g/dl for women 14.0-18.0 g/dl for men
1	Mild	10 g/dl to levels within normal limits
2	Moderate	8.0-10.0 g/dl
3	Severe/serious	6.5-7.9 g/dl
4	Life threatening	<6.5 g/dl

Functions of RBC:

The body makes three types of blood cells that are white blood cells to fight infection, platelets to clot the blood, and red blood cells to carry oxygen from the lungs to the rest of the body and carbon dioxide from the body back to the lungs. Red blood cells contain hemoglobin, which is an iron-rich protein that gives its red color to blood. Hemoglobin enables red blood cells to carry oxygen from your lungs to all parts of the body. Most of the blood cells, including red blood

cells, are produced regularly in bone marrow which is a spongy material found within the cavities of many of large bones. To produce hemoglobin and red blood cells, body needs iron, vitamin B-12, folic acid and other nutrients from the food.

Risk factors for anemia

The following factors increase the risk of anemia

- **A diet lacking in certain vitamins and minerals.** A diet consistently low in iron, vitamin B-12, folic acid and copper increases the risk of anemia.
- **Intestinal disorders.** An intestinal disorder that affects the absorption of nutrients in small intestine such as Crohn's disease and celiac disease will increase the risk of anemia.
- **Menstruation.** In general, women who haven't had menopause have a greater risk of iron deficiency anemia when compared to postmenopausal women. Menstruation causes the loss of red blood cells.
- **Pregnancy.** Being pregnant and not taking a multivitamin with folic acid and iron, increases the risk of anemia.
- **Family history.** If a family has history of an inherited anemia, such as sickle cell anemia will increase the risk of the condition.
- **Other factors.** A history of certain infections, blood diseases and autoimmune disorders increases the risk of anemia. Alcoholism, exposure to toxic chemicals and the use of some medications can affect red blood cell production and lead to anemia.

ANEMIA IN CHRONIC KIDNEY DISEASE PATIENTS⁽⁴⁾

Epidemiology of Anemia in CKD

Anemia is a common complication in chronic kidney disease (CKD) and it is associated with a reduced quality of life. EPO deficiency anemia and iron deficiency anemia are common types of anemia in CKD patients.

Anemia is more prevalent and severe as the estimated glomerular filtration rate (eGFR) declines. An analysis of the cross-sectional data from the National Health and Nutrition Examination Survey (NHANES) in 2007–2008 and 2009–2010 revealed that anemia was twice as prevalent in patients with CKD as in the general population (15.4% vs. 7.6%). The prevalence of anemia raised with the progression of CKD: 8.4% at stage 1 to 53.4% at stage 5. In addition, they observed an increased prevalence of anemia among diabetic patients, independent of eGFR and albuminuria.

Causes of Anemia in chronic kidney disease patients

The mechanisms of anemia in CKD are multifactorial. The progressive reduction of endogenous erythropoietin (EPO) levels has classically been considered to play a preeminent role. However, other factors have also been described to contribute to anemia in CKD patients, such as an absolute iron deficiency due to blood losses or an impaired iron absorption, an ineffective use of iron stores due to increased hepcidin levels, systemic inflammation due to CKD and associated comorbidities, a reduced bone marrow response to EPO due to uremic toxins, a reduced red cell life span, or vitamin B12 or folic acid deficiencies.

Treatment of anemia in CKD

Erythropoiesis-Stimulating Agents (ESAs)

The first EPO analog available was epoetin α and short time later epoetin β . It is produced by recombinant DNA technology in cell cultures. Darbepoetin α (DA) and methoxy polyethylene glycol-epoetin β were developed thereafter and presented a prolonged half-life. More recently, biosimilars of the original epoetin have been introduced in the market.

Iron Supplementation for Anemia in CKD

In recent years some good quality pre-clinical studies, clinical trials and epidemiological studies have shed some light on the therapeutic approach regarding iron deficiency in CKD and will surely change clinical practice. Three types of iron supplements available in market are iron dextran, ferric gluconate and iron sucrose.

OBJECTIVES OF THE STUDY:

- To study the prevalence of anemia in chronic kidney disease patients
- To identify the various reasons for developing of anemia in pregnant women
- To know risk factors causing anemia

- To know the various complications of anemia in both pregnant women and CKD

Inclusion criteria

- Patients having chronic kidney disease or renal failure
- Pregnant women
- The women who are tested positive with HCG (Human Chorionic Gonadotropin)

Exclusion criteria

- Non renal failure chronic kidney disease patients
- Non-pregnant women

METHODOLOGY

1. Study area and design

The study was conducted in government area hospital of Narasaraopet from February 20 to May 10, 2022. Narasaraopet is a city and district head quarter of Palanadu district of India state in Andhra Pradesh. The town also is the set of court of additional district.

Government hospital in Narasaraopet is a well-equipped hospital with all modern equipment. The hospital has separate waiting and consultation areas which allow enough space for patients to wait conveniently. The clinic being a specialized hospital doctor offers a number of medical services. Most of the people who are coming Narasaraopet area hospital are pregnant women and renal failure patients. The Area Narasaraopet hospital provides antenatal care (ANC) for pregnant women in Narasaraopet. A hospital-based case control study was used to identify the determinants of anemia among pregnant women and CKD patients attending the hospital.

Source and study population

Pregnant women of different trimester and chronic kidney disease patient who were receiving area hospital care service in Narasaraopet were the source of population. we collected data.

Definition of anemia

Anemia defined according to world Health Organization (WHO) as anemia is chronic condition which is due to lack of enough healthy red cells. pregnant women with Hb levels less than 11.0g/dl in 1 st trimester and 3 rd trimester and less than 10.5 g/dl in 2 nd trimester are considered as anemic. In CKD patients whose hemoglobin level greater than 12 gm/dl for female and 14gm/dl for male are considered as control and patients with hemoglobin less than normal limits are considered as case The patient whose hemoglobin level was 11g/dl and above are selected as control (non-anemic) and those with a hemoglobin level less than 11g/dl were selected as case (anemic) in case of pregnant women.

Ethical consideration

The study was conducted after getting ethical clearance from Institutional ethics committee, and Narasaraopet institute of pharmaceutical science, Narasaraopet. The written informed consent was secured from study participant after explaining about objective and purpose of the study to each participant. The study participants were also assured about the confidentiality of the data.

RESULTS

Table-2: distribution of CKD patients based on gender

Study Population	Number	Percentage
Male	41	62%
Female	25	38%
Total	66	100%

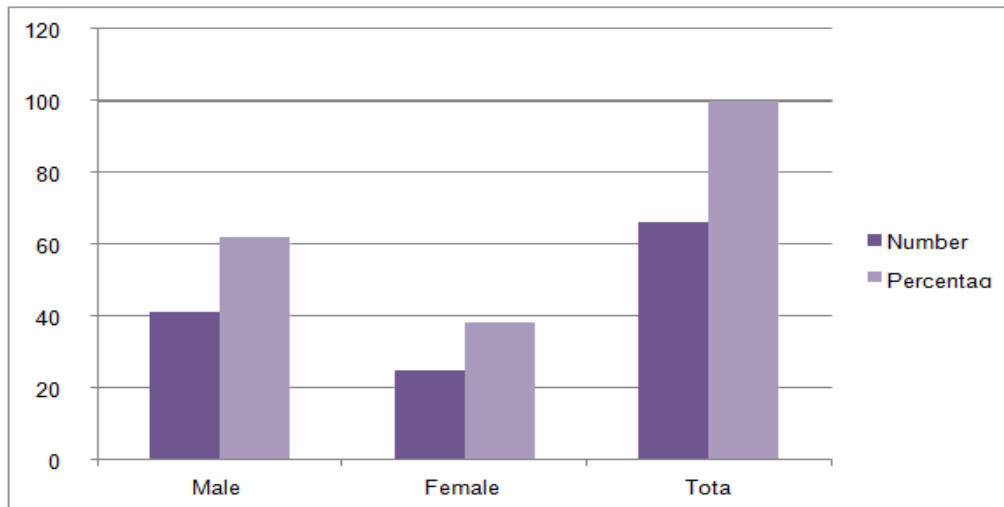


Figure- 1: Distribution of CKD patients based on Gender

According to **Figure-1** A total of 66-CKD patient's data was collected. out of 66 patients, **62%**were **male** and **38%** were **female**

Table: 3 Division of anemic and non anemic patients

Division of anemia	Number	Percentage
Anemic	53	81%
Non-Anemic	13	19%
Total	66	100%

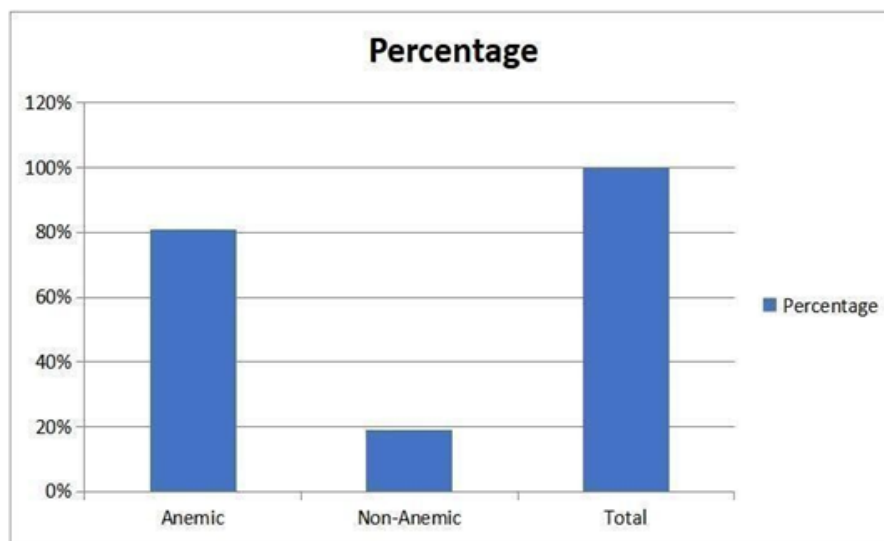


Figure-2: Percentage of anemic and non-anemic patients in CKD

According to Figure-2 out of 66-patients 81% were Anemic and 19% were non-Anemic

Table-4: Distribution of patient based on type of Anemia in CKD

Type of Anemia	No. of patients	Percentage
Mild	19	36%
Moderate	23	43%
sever	11	21%

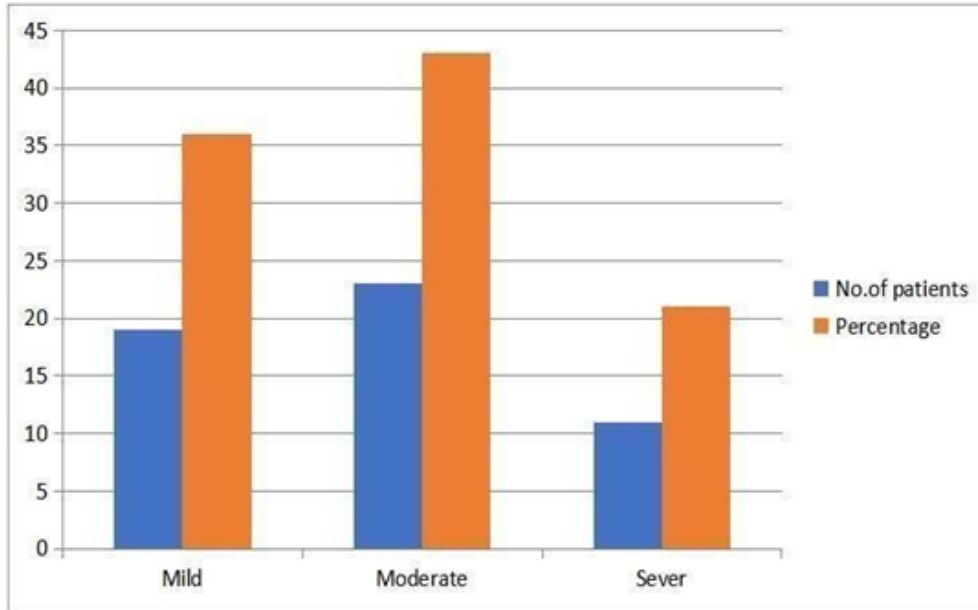


Figure-3: Distribution of patient based on type of Anemia in CKD

According to figure-5 Out of 66-CKD patients 36% were Mild Anemic, 43% were moderate Anemic and 21% were severe Anemic

Table 5: number of pregnant women in different trimesters

Study Population	number	Affected	Percentage
I-Trimester	40	25	71%
II-Trimester	38	26	68%
III-Trimester	33	23	69%

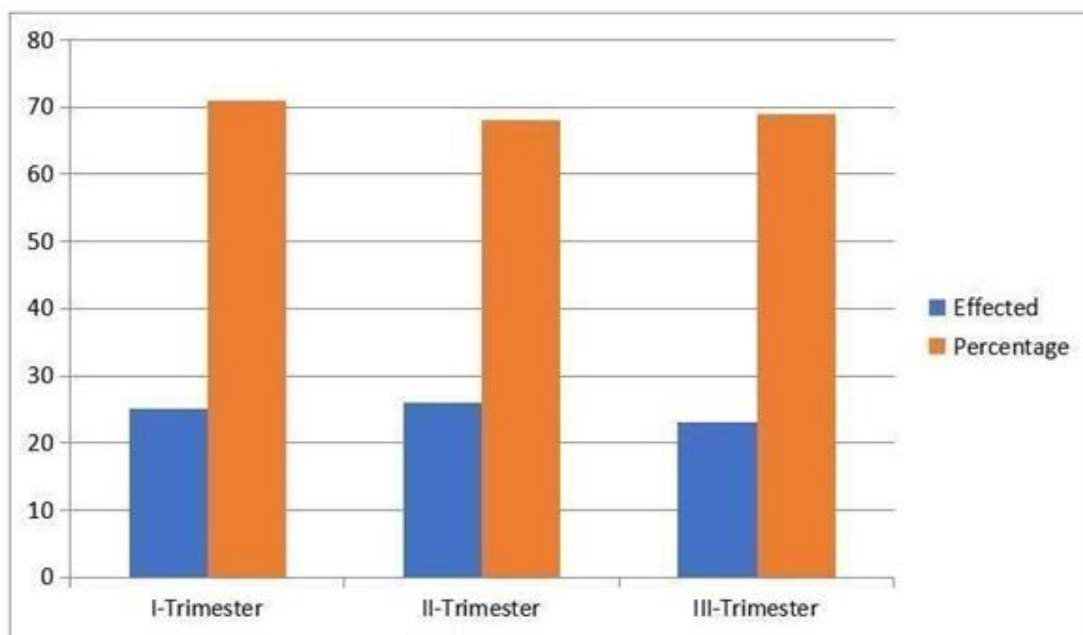


Figure-4 number of pregnant women in different trimesters

According to the figure 1, 25 women were Affected by anemia with a percentage of 71 in first trimester. 26 women were having anemia with percentage of 68%. During 3 trimester 23 women had anemia with percentage

Table5: Distribution pregnant women based in type of anemia

Type of anemia	Number	Percentage
Mild	24	32
Moderate	31	43
Sever	19	25

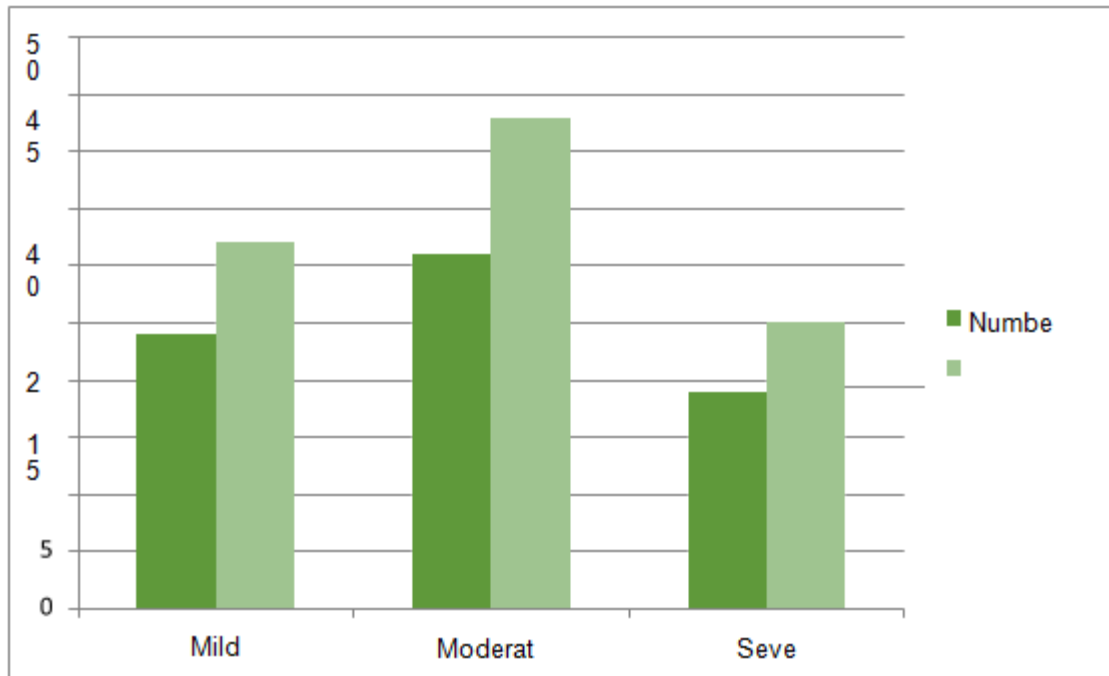


Figure 5: Distribution pregnant women based on type of anemia

According to the figure 24 pregnant women have mild anemia with percentage of 32% and 31 pregnant women are have moderate anemia with the percentage of 43% and 19 pregnant women are have severe anemia with the percentage of 25%.

CONCLUSION

The present study revealed that anemia is a major health problem among pregnant women and chronic kidney disease patients. There was a higher prevalence of moderate anemia as compared to mild and severe anemia. In pregnant women the prevalence of anemia was 66%. Anemia is the most common problem in pregnancy because, during pregnancy maternal plasma volume increases to meet the greater circulatory needs of placenta and maternal organs. An inadequate intake of iron and Morning sickness lead to anemia. Most of the data was collected from the pregnant women who belongs to below poetry line, due to imbalance in diet and lack of vit B12 folic acid causes anemia

In CKD patients the prevalence of anemia was 81%.the prevalence of anemia was increased when the stages of chronic kidney disease increase and worsened with a progressive decline in kidney function. The CKD stage III, IV, V are more anemic than that of stage I and II, it occurs due to kidney fail to produce erythropoietin hormone which is necessary for RBC production and deficiency of vit B12 and folate leads to anemia. Other causes are blood loss, infection, inflammation and malnutrition.

It can be managed by taking iron supplements like ferrous sulphates, ferrous fumarate, ferrous gluconate etc... and epoetin alpha, Procrit and folic acid. There is a need to include iron rich food in diet like Grams, maize mustard leaf, milk powder and red meet has high iron components so at least once in a week should eat rich foods to get recommended iron. community plays a significant role in providing health service and information to the people. social marketing is one of the ways to create awareness of anemia and demand for supply of Health services from govt side counselling can be given to empower patients to make understand the importance of precautions measures to avoid anemia.

New innovative and cost-effective methods should be developed for the fortification of common people food. This

will help to increase iron rich food for long term in sustainable manner. The training programs should be organized to make people to aware about fortification of food as well as importance of iron intake. monitoring and evaluation of government programs should be strengthened. monitoring of programs should be done properly and effectively time to time.

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