Original Article

An Examination on the Causes and Treatments of Nutritional Anaemia During Pregnancy

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Article History:	Abstract
  	This Study examined the Causes and Treatments of Nutritional Anaemia During Pregnancy. To determine the prevalence of anemia, its risk factors, and treatment in pregnant women. ANEMIA is a hematological disorder common among pregnant women. It is a global health problem, and the high prevalence of anemia in pregnant women mainly increases maternal and fetal risks. Through this Study, we come to know that nutritional deficits during pregnancy pose a severe impact on both mother and fetus, and this should be considered as a serious health concern. Awareness sessions should be conducted for pregnant women through appropriate nutritional counseling during the antenatal visits. Nutritional anemia can be treated by receiving healthy, nutrient-rich food and iron & folate supplements as prescribed during the pregnancy and before conception. Through this Study, we know that iron, folic acid, and vitamin B12 play an essential role in the growth and development of the fetus. Continuous awareness and educational programs should be conducted regarding nutritional anemia among rural and urban people to prevent the complications and risk factors associated with anemia in pregnancy.

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INTRODUCTION

Biologically expressed as hypochromic, microcytic anemia, iron-deficiency anemia is a Haemoglobin (Hb) synthesis disease caused by a reduction in the body's overall iron reserves. Iron insufficiency is the most prevalent dietary severe deficit impacting low-income socioeconomic groups globally. Due to the limited availability of foods containing iron and their increased dietary needs, young children between six months and three years are more susceptible to iron-deficiency anemia. The World Health Organisation (WHO)

has acknowledged that fewer than 50% of children under five may have iron-deficiency anemia [1]. According to WHO estimates, the proportion of children in the European region with iron-deficiency anemia who responded well to iron supplementation ranged between 44% and 65%. It has been estimated that the prevalence of iron-deficiency anemia in children under five is between 1% and 4% in the UK, the USA, and other industrialized nations. According to the research, children's iron-deficiency anemia is more common in places like Africa, South Asia, and Latin America, where it affects 45% to 65% of the population [2]. Hospitalization is warranted for severe iron-deficiency anemia, including low serum iron levels, ferritin, hypochromic, microcytic, and Hb< 7 g/dL. Numerous studies have consistently found detrimental effects of iron-deficiency anemia, particularly the severe form, on immune development, neurological function, cognitive function, academic performance, and exercise tolerance that last long after treatment is started. Thus, it's essential to have a thorough understanding of the risk factors for iron-deficiency anemia. These include individual characteristics like age, gender, and birth score; maternal factors like mother's age, history of anemia, and educational attainment; and environmental factors like birth score [3].

METHODOLOGY

SITE OF STUDY:

The Study "An Examination on the Causes and Treatments of Nutritional Anaemia During Pregnancy." This was carried out at Krishna Institute of Medical Sciences, Nellore. Under the guidance of Dr. R. Gautam Chakra, Assistant Professor, Saastra College of Pharmacy, Nellore.

Study Design:

This observational Study is being carried out prospectively in the outpatient departments [4].

Study Period:

A six-month prospective observational study was carried out at the Krishna Institute of Medical Sciences in Nellore [5].

Study site:

The Study will be conducted at Kim's Hospital, Nellore.

Study population:

Approximately 60 patients who are diagnosed with ANEMIA are presently under treatment [6].

Study duration:

Six months (January 2024 to June 2024).

Study criteria/Patient enrolment:

Based on inclusion and exclusion criteria, patients are included in the research.

Inclusion criteria:

Pregnant women aged 18-35 years were diagnosed with anemia and were under treatment.

Pregnant women with Haemoglobin ≥ 11gm/dl [7].

Exclusion criteria:

Patients above 18-50 years were not included in this Study.

Any other cases that mimic Anaemia cases may not be included in this Study.

Hb with a typical range is not included in this Study [8].

Children

Chronic infection's

Cancer/ HIV patients

Study materials [9-10]:

Patient informed consent form (Annexure- I)

A specially designed patient data collection Proforma (Annexure-II)

A separate questionnaire form (Annexure-III)

Study Method:

The institutional Ethical Committee's approval is required before this Study may begin. Once the patients have informed consent, they will be included in the Study. The Study's inclusion and exclusion criteria determine which patients are chosen. The Chart Review Method will be utilized to gather the necessary data for the current Study, as it is an effective way to determine all pertinent and essential baseline data. Which will be collected using a specially created Patient Data Collection Proforma. This will include information about the patient's name, age, sex, socioeconomic status, family income,

educational attainment, high-risk factors, past and present medical and medication histories, lab and radiographic data, physician medication order forms, nurse prescription drug records, and any additional verbal communication data.

Study Procedure:

A prospective observational study was conducted for 6months in the KIMS hospital, Nellore.

The Nutritionally Anemic patients were recruited for the Study based on the inclusion and exclusion criteria.

We have obtained the Informed Consent Forms from the patients willing to participate in the Study [11].

The data was collected from the Chart Review Method, Personal (patient and/or patient representative) interviews, and professional (Doctors/Nurses/Technicians) interviews using a well-structured patient data collection proforma and follow-up.

The patient data collection proforma was used to gather all relevant baseline data, including patient demographics, age, gender, work position, and personal history and habits.

Present illness, Past medical &medication history, and Present medication Underlying causes of Anemia Duration [12].

Using the relevant statistics based on the following parameters, the data collection and documentation were examined:

Age-wise distribution of participants

Education wise distribution

Occupation wise distribution

Family wise distribution

Income wise

Distribution Number of pregnancy

Distribution of pregnancy interval

Distribution of Gestational age

Diet wise distribution

Previous history of anemia

Incidence of anemia

Awareness status

Understanding of anemia's symptoms and indicators Understanding of causes of anemia Knowledge regarding proper diet to prevent anemia Knowledge of perceived effects of anemia Preventive practice regarding anemia [13].

Severity of anemia

Knowledge towards perception about vulnerability to anemia: Are you taking iron tablets during pregnancy? What is the reason for irregular iron consumption? Distribution of sources of information.

Mode of Statistical analysis of data:

The variance of each Study was calculated using the binomial distribution since the prevalence of anemia and the sample size were collected from each Study. The prevalence of several studies was combined using the average weight. Every Study was assigned a weight based on its variance. The random effects model was employed in the meta-analysis due to the significant variations in the prevalence of various studies and the importance of the heterogeneity index (I2) [14].

Result Analysis:

The obtained patient data was used to analyze the following parameters: Demographic details, Causes and Risk factors, Severity of anemia, Complications of anemia, and Treatment/Management strategies.

Conclusion & Future Recommendations:

This Study will teach the prevalence, causes, risk factors, and management strategies associated with nutritional anemia in pregnant women. The Study was conducted in a single hospital, but many hospitals may undergo such anemia cases in the future. They may have the following complications such as Preterm Labour Spontaneous abortion.

Increased risk of postpartum depression

Low birth weight

Cardiac failure during labor Preeclampsia

Increased risk of infections

Placental abruption

Premature rupture of membranes(PROM)

Maternal deaths.

RESULTS AND DISCUSSION

RESULTS

Our sample size was 60 pregnant women from the age group of 18-35 years. Out of these 60, 13 are under the age group of 18-20 years, followed by 16 are under the were high in the age group of 21-25 years; 14 are in the age group of 26-30 years, and the most minor distribution, 17 are under the age group of 31-35 years.

Table 1 Participants' age distribution

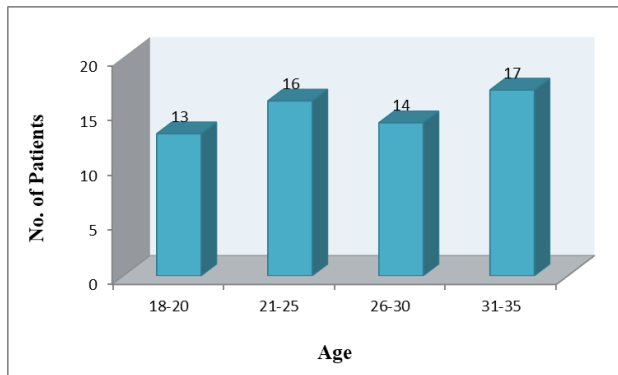| Age Group In Years	Total No of Participants (N=60)	Percentage (%)
18-20	13	23.5%
21-25	16	35.1%
26-30	14	29.5%
31-35	17	11.9%
Total	60	100%

Figure 1 Participants' age distribution
Table 2 The number of pregnancies

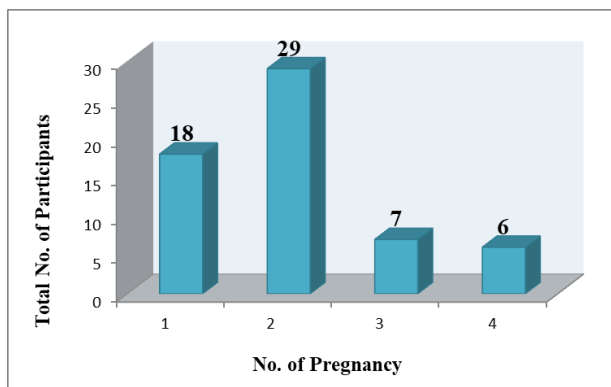| No. of pregnancy	Total no. of participants (n=60)	Percentage (%)
1	18	27.7%
2	29	57.4%
3	7	10.7%
4	6	4.1%
Total	60	100%

Figure 2 The number of pregnancies

The majority of the pregnant women, 27 (46.5%), had a gap interval of less than two years, two to three years, 19 (35.9%), and more than four years, 14 (17.6%). (Table 3). Women who have less than two years between pregnancies are more likely to develop anemia.

Table 3 The distribution of the pregnancy interval

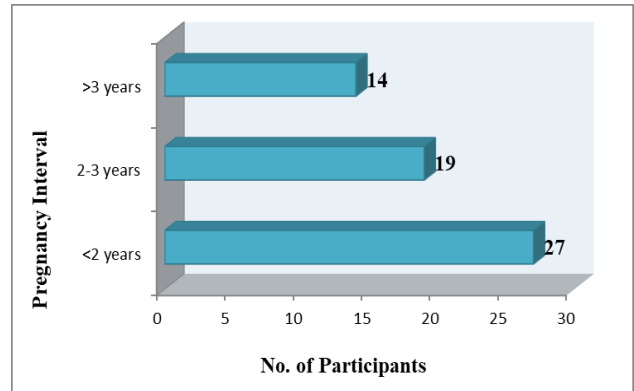| Pregnancy interval	Total No. of participants (n=60)	Percentage(%)
<2 years	27	46.5%
2-3 years	19	35.9%
>3 years	14	17.6%
Total	60	100%

Figure 3 Distribution of pregnancy interval
Table 4 Gestational age distribution

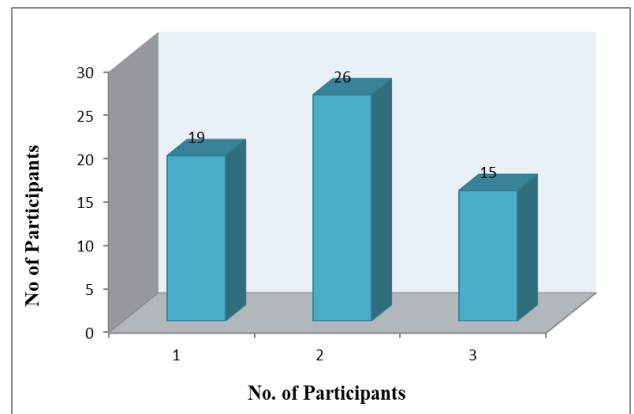| Trimester level	Total no. of participants (n=60)	Percentage (%)
1	19	33.7%
2	26	42.6%
3	15	23.7%
Total	60	100%

Figure 4 Distribution of gestational age

Table 5 Dietary distribution

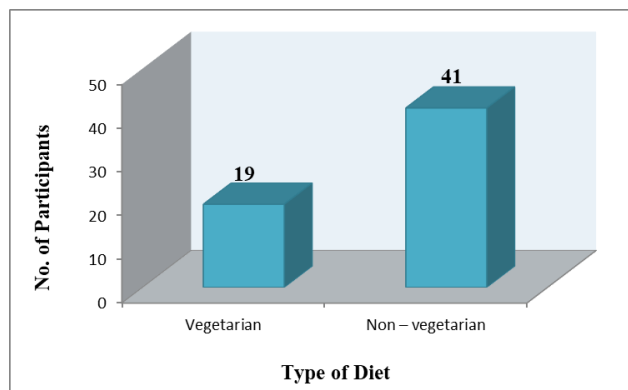| Type of diet	Total no. of participants (n=60)	Percentage (%)
Vegetarian	19	23.7%
Non – vegetarian	41	76.3%
Total	60	100%

Figure 5 Diet-wise distribution

Table 6 Experience with anemia

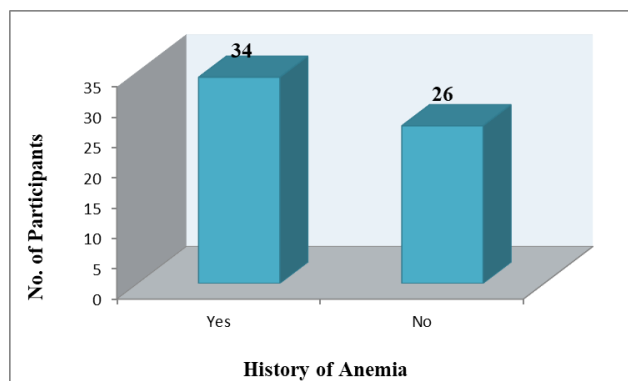| History of anemia	Total no of participants (n=60)	Percentage (%)
Yes	34	57%
No	26	43%
Total	60	100%

Figure 6 Experience with anemia

Table 7 Presence of anemia

Presence of anemia	Total no of participants (n=60)	Percentage (%)
Yes	42	73.7%
No	18	26.3%
Total	60	100%
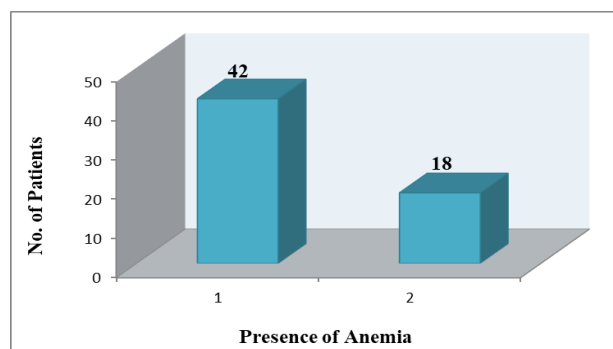
Figure 7 Incidence of anemia

Table 8 Awareness status

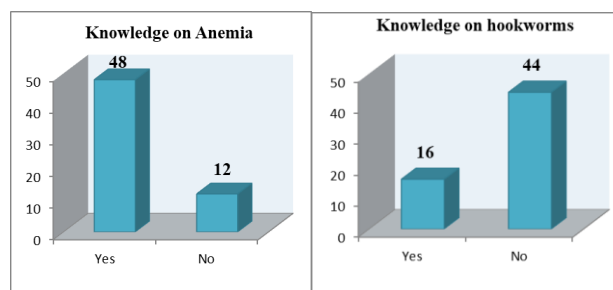| Awareness status	Total no of participants n=60	Percentage (%)
Information about anaemia		
Yes	48	87.5%
No	12	12.5%
Information about hookworms		
Yes	16	21.7%
No	44	78.3%

Figure 8 Information about Anemia and Hookworms

Table 9 Information about signs and symptoms of anemia

Sign and symptoms	Know	Don't know
Pale palm	16 (30.9%)	36 (70.2%)
Pale conjunctiva	34 (65.8%)	18 (34.2%)
Pale palm & conjunctiva	16 (30.1%)	36 (69.9%)
Paleness of face	19 (35.7%)	33 (64.3%)
Pallor of tongue	27 (52.9%)	25 (47.1%)
Pallor of nails	22 (41.9%)	30 (58.1%)
palpitation	12 (22.8%)	40 (77.2%)
headache	9 (16.5%)	43 (83.5%)
Shortness of breath	14 (26.8%)	38 (73.2%)
dizziness	32 (62.9%)	20 (37.1%)
Loss of appetite	11 (19.1%)	41 (80.9%)
Tiredness/weakness	28 (53.3%)	24 (46.7%)

Table 10 Information about causes of anemia

Causes	Know	Don't know
Pregnancy	15 (28.3%)	37 (71.7%)
Repeated pregnancy at a short interval, i.e., <2 years	9 (16.5%)	43 (83.5%)
Malaria	12 (21.3%)	40 (78.7%)
Poor diet	38 (74.3%)	14 (25.7%)
Worm infection	8 (13.6%)	44 (86.4%)
Age	10 (18.8%)	42 (81.2%)

Table 11 Information about the perceived effects of anemia

Complication	Know	Don't know
Death	16 (29.4%)	36 (70.6%)
Low birth weight	22 (41.2%)	30 (58.8%)
Miscarriage	21 (39%)	31 (61%)
Preterm/premature birth	19 (35.3%)	33 (64.7%)

Table 12 Information about the perception and vulnerability of anemia

Vulnerability to anemia	Total no of participants (n=60)	Percentage (%)
Everybody	12	18%
Pregnant women	18	28.7%
Women	21	38.2%
Children	9	15.1%

In the Study (Table 17), 29 (49.5%) pregnant women had mild anemia, 9 (14.5%) had moderate anemia and 6 (8.7%) had severe anemia. 16 (27.3%) of pregnant women have no anemia. Anemia is a widespread public health problem associated with an increased risk of morbidity and mortality, especially in pregnant women. Based on WHO criteria, the Hb level during pregnancy is 11.0g/dl in the first and 10.5g/dl in the second half of pregnancy. The WHO further divides anemia in pregnancy into degree (Hb 9.0- 11g/dl), moderate (7.0-9.0g/dl), and severe (4.0-7.0g/dl). The most important cause of anemia is deficiency of iron, folate, and vitamin B12; iron deficiency anemia is the most common.

Reason perceived by antenatal women for cause of anemia is present in (Table 18); among 60 anemic pregnant women, 24 (41.9%) anemic cases were caused due by no interval between subsequent pregnancies, 16 (26.4%) cases were not taking iron supplementation during pregnancy, 9 (15.4%) were not consuming iron-rich diet, 9 (13.3%) were due to increase blood loss during periods and most minor, 2 (3%) due to hookworm infestation. Previous Studies clearly showed a significant association between women's education and knowledge regarding the cause of anemia, prevention, and treatment of anemia, and preventive practice regarding anemia. The demand for iron increases about six to seven times from early to late pregnancy.

Table 13 Information about proper diet to prevent anemia

Knowledge towards diet	Know	Don't know
A balanced diet during pregnancy prevents anemia	37 (72.4%)	15 (27.6%)
Iron-rich foods include sprouted grains and green leafy vegetables	38 (73.9%)	14 (26.1%)
Meat contains a lot of iron	35 (68.8%)	17 (31.2%)
Iron is abundant in the liver	32 (62.1%)	20 (37.9%)
When pregnant, ragi and jaggery should be avoided	18 (34.2%)	34 (65.8%)
Overconsumption of tea or coffee may lead to IDA	19 (36.4%)	33 (63.6%)
Iron consumption in conjunction with diet reduces adverse effects	16 (29.4%)	36 (70.6%)

Table 14 Details regarding prenatal visits and pregnancy treatments

Knowledge towards treatment	Know	Don't know
Frequent prenatal visits are essential	29 (56.6%)	23 (43.4%)
Iron and folic acid must be consumed daily	33 (64.7%)	19 (35.3%)
Sufficient healthcare is required to address hookworm infection	18 (14.3%)	44 (85.7%)
Are vitamin C tablets taken with iron tablets?	6 (9.6%)	46 (90.4%)
Are you aware that GH provides free iron tablets to expectant mothers?	5 (7.7%)	47 (92.3%)

Table 15 Question based on attitude

Attitude towards anemia	Yes	No
A low Hb level is anemia	19 (35.3%)	33 (64.7%)
Pregnancy requires a minimum of 11 g/dL of Hb	21 (39.7%)	31 (60.3%)
Iron-rich foods and iron supplements can help avoid anemia	28 (54%)	24 (46%)
Consuming lemon juice can improve the body's absorption of iron	6 (10.3%)	46 (89.7%)
An essential component needed by Hb during pregnancy is iron	18 (33.8%)	34 (66.2%)
Anaemia makes childbirth extremely challenging	37 (71.7%)	15 (28.3%)
Pregnancy is not made more accessible by anaemia	16 (29.4%)	36 (70.5%)
Pregnant women who have anemia are too tired to deal with anemia	39 (76.1%)	13 (23.9%)
For newborns, treating anemia is beneficial	41 (80.1%)	11 (19.8%)

Table 16 Preventive practice regarding anemia

Practice towards anemia	Yes	No
Have you attended any awareness programs before	3(5.5%)	47(94.5%)
Have you changed your regular dietary pattern during pregnancy?	35(69.9%)	15(30.1%)
Do you include green leafy vegetables in your diet every day	26(52.2%)	24(47.8%)
Do you include sprouted grains in your diet every day	14(29.4%)	36(70.6%)
Do you include fiber-rich food frequently	19(37.5%)	31(62.5%)

Do you use ragi in your diet	17(34.6%)	33(65.4%)
Do you use jaggery in your diet	31(61.8%)	19(38.2%)

Table 17 Severity of anemia

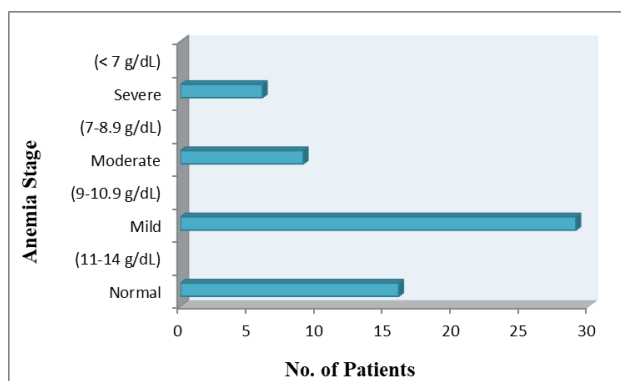| Anemia stage	Total no of participants (n=60)	Percentage (%)
Normal (11-14 g/dL)	16	27.3%
Mild (9-10.9 g/dL)	29	49.5%
Moderate (7-8.9 g/dL)	9	14.5%
Severe (< 7 g/dL)	6	8.7%
Total	60	100%

Figure 9 Severity of Anemia

Table 18 Reason perceived by antenatal women for the cause of anemia

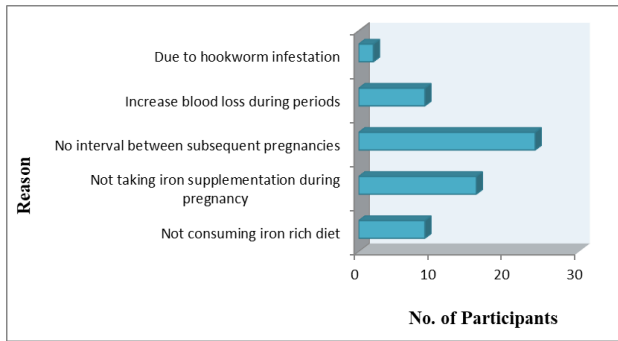| Reason	Total no of participants (n=60)	Percentage (%)
Not consuming a rich diet	9	15.4%
Not taking iron supplementation during pregnancy	16	26.4%
No interval between subsequent pregnancies	24	41.9%
Increase blood loss during periods	9	13.3%
Due to hookworm infestation	2	3%
Total	60	100%

Figure 10 Reason perceived by antenatal women for cause of anemia

35(63.2%) pregnant women regularly consumed iron tablets, the remaining 16 (23.5%) were irregular, and 9 (13.3%) were not at all consuming iron tablets (Table 19).

Table 19 Are you taking iron tablets during this pregnancy?

Iron consumption	Total no of participants (n=60)	Percentage (%)
Regular	35	63.2%
Irregular	16	23.5%
Not taking	9	13.3%
Total	60	100%
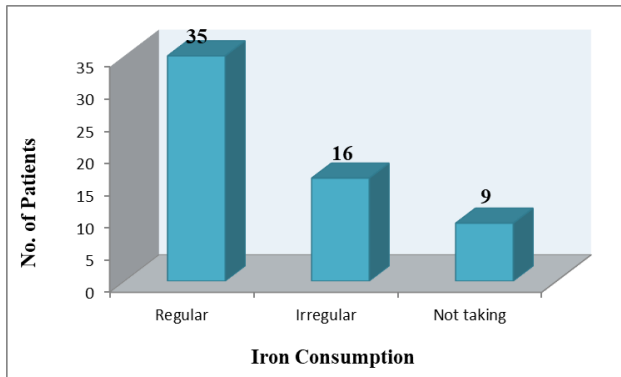
Figure 11 : Are you taking iron tablets during this pregnancy?

Among 60 irregular iron consumption participants, 23 (37.6%) had reported forgetfulness, 17 (29.4%) felt it was not necessary, 11 (19.3%) due to side effects, and 9 (13.7%) due to cost as the reason for non-adherence towards medicine (Table 20). During pregnancy, iron and folate supplements are essential to prevent nutritional anemias. The developing countries strictly follow iron supplementation during pregnancy, and it is considered a standard and routine practice for preventing anemia. The WHO recommends taking about 30-60mg of elemental iron and 400 of folic acid during the second and third trimesters of pregnancy.

Table 20 Reason for irregular iron consumption

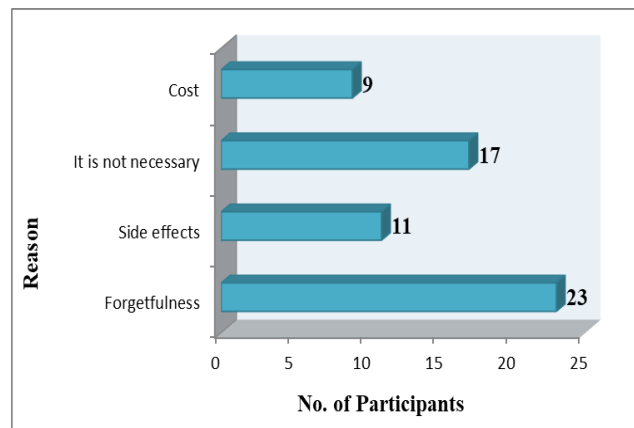| Reason	Total no of participants n=60	Percentage (%)
Forgetfulness	23	37.6%
Side effects	11	19.3%
It is not necessary	17	29.4%
Cost	9	13.7%
Total	60	100%

Figure 12 Reason for irregular iron consumption

The majority of participants, 26 (48.2%), had received information from health workers, 13 (26.7%) from relatives and friends, 15 (21.3%) from mass media, and the least, 6 (3.8%) from self-study (Table 21).

Table 21 Distribution of sources of information

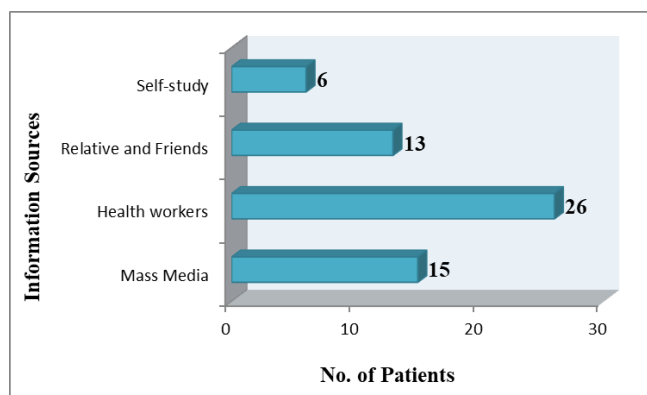| Information sources	Total no of participants n=60	Percentage (%)
Mass Media	15	21.3%
Health workers	26	48.2%
Relative and Friends	13	26.7%
Self-study	6	3.8%
Total	60	100%

Figure 13 Distribution of sources of information

CONCLUSION

In this Study, it is concluded that most pregnant women are anemic because of recurrent pregnancy at shorter intervals of time, less than two years, and women do not efficiently adhere to iron supplementation and lack knowledge and attitude towards nutritional anemia.

The Study found that the women have good enough knowledge of anemia's signs, symptoms, and vulnerability but lack knowledge regarding its causes and severe effects. Through this Study, we conclude that nutritional deficits during pregnancy profoundly impact both the mother and fetus, and this should be considered a severe health concern. Awareness sessions should be conducted for pregnant women through appropriate nutritional counseling during the antenatal visits. Through this Study, we know that iron, folic acid, and vitamin B12 play an essential role in the growth and development of the fetus.

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Conflict of Interest: The Author declares that there is no conflict of interest.

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