A Descriptive Study to Ascertain the Level of Knowledge, Attitude and Practice about Anemia among Pregnant Women

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Abstract: _Objective: The primary objective of this study is to determine knowledge, attitude and practice levels regarding anemia among pregnant women in Surat, Gujarat. This study was also conducted to identify the association between knowledge, attitude and practice and socio-demographics and antenatal characteristics. Background: Anemia in pregnancy is a condition where the number of red blood cells is insufficient to meet the body's needs. Pregnant women are at higher risk of anemia, which can lead to complications such as fetal growth retardation, stillbirth, and maternal deaths during childbirth. Anemia is a major cause of maternal and fetal mortality worldwide. It impairs cognitive development, reduces physical work capacity, and increases risk of mortality. In India, it is the second most common cause of maternal death, accounting for 20% of total maternal deaths. It affects both the mother and fetus and is one of the contributing factors to morbidity and mortality during pregnancy in underdeveloped nations. Low maternal risk perception, poor eating habits, and low iron supplement adherence are major causes of anemia. Material &Method: The study was a prospective descriptive study conducted to assess the level of knowledge, attitude, and practice of anemia among pregnant women. The sample size was 160 pregnant women aged between 18-40 attending an antenatal clinic. The study used a validated questionnaire to assess patient awareness and perception of anemia, and patient information leaflets were provided to improve understanding. MS Excel was used to analyze the data for counts and percentages. Result: The majority of Anti-Natal cases were under the age of 30, with 105 pregnant women (66%) suffering from mild, moderate, and severe anemia. 80% of pregnant women were in the 21-30 age group. The prevalence of anemia increased with the duration of pregnancy, with the majority of participants enrolled in third trimester 96 (60%), followed by second trimester 42 (26.25%) and first trimester 22 (13.75%). The majority of pregnant women studied 8th-10th grade, with higher levels of education associated with less anemia. Iron supplements were taken from the first trimester in our study. Age has a significant association with knowledge, attitude and practice, with 31–40-year-olds having more knowledge, attitude and practice than 18–20-year-olds and 21–30-year-olds. Education is linked to knowledge, attitude, and practice, graduates having more knowledge, attitude, and practice than others. This suggests that education is closely associated with anemia during pregnancy, with higher education resulting in more knowledge, attitude, and practice. Gravida increases, hemoglobin levels decrease, demonstrating a correlation between gravida and hemoglobin levels. The participants' overall evaluation of knowledge, attitude, and practice was low, as indicated by the sum score outcome. Knowledge was low (47.78%), attitude (50.14%), and practice was moderate (51.49%). The mean percentage of knowledge, attitude, and practice was 49.8021%. Conclusion: This study found that there was a lack of knowledge and attitude in rural areas due to people's low levels of education, age, and economic factors. This study was conducted because there haven't been many studies on knowledge, attitude, and practices regarding anemia among pregnant women in Gujarat, India. It also showed that the average hemoglobin level of pregnant women in Surat needed to be improve._

Keywords: Anemia in Pregnancy, Hemoglobin, Iron Deficiency Anemia, Questionnaire, Knowledge, Attitude, Practice

Abbreviations: KAP- Knowledge, Attitude, Practice; **WHO**- World Health Organization;**LBW-** Low Birth Weight; **IDA**- Iron Deficiency Anemia; **CDC-** Centre for Disease Control; **MMR-** Maternal MortalityRate; **Hb-**Hemoglobin; **RBC-**Red Blood Cells; **OPD-** Out Patient Department; **O&G-** Obstetrics and Gynecology

1. Introduction

Anemia in pregnancy is defined by World Health Organization (WHO) as a hemoglobin concentration below 11g/dL [1]. Anemia is a condition whereby the number of red blood cells that transport oxygen is insufficient to meet the needs of the body. Hemoglobin is a component found in red blood cells that carries oxygen [2].

Pregnancy is a critical time in a woman's life, as pregnant women will experience many changes, including physical and psychological ones, during pregnancy. To provide enough nutrients for the growing fetus as well as ensuring the mother's well-being, the demand for energy, macronutrients, and micronutrients will be largely increased. Females in developing countries are at risk of malnutrition and nutritional deficiencies during pregnancy, which will lead to adverse pregnancy outcomes, such as delayed fetal growth, premature birth, low birth weight (LBW), and maternal anemia. [3]

According to a report by the WHO, the global prevalence of anemia in pregnant women aged 15-49 years old was 38.2%, while the prevalence of anemia in pregnant women in Asian countries was 39.3% [1]. During pregnancy, women will experience higher blood volume and an increase in the mass of red blood cells, an expansion of 45% [4]. For this reason,

hemoglobin level below 10g/dL at any time during pregnancy is considered anemia (WHO, 1993; CDC, 1990) Therefore, pregnant women are at higher risk of anemia during pregnancy and this increases the risk of complications that contribute to the morbidity and mortality of the mother and fetus, such as fetal growth retardation, stillbirth and maternal deaths during childbirth.

According to WHO, Iron deficiency is the most common nutritional problem in the world that affects about 25% of the world population, especially women in child bearing age. As pregnant women need to have more red blood cells to carry oxygen around her body and her baby's, it is more common in pregnancy [5].

Despite increased iron requirements, pregnancy is also a period of increased risk for anemia which is higher than in non-pregnant women [6].

Anemia in pregnancy is considered as per CDC (center for disease control) modified WHO definition as follows:[7]

Table 1: Trimester wise hemoglobin cut off defining Anemia in Pregnancy

Trimester	Hemoglobin level	Hematocrit
First trimester	Hb< 11 g%	Hct < 33%
Second trimester	Hb < 10.5 g%	Hct < 32%
Third trimester	Hb < 11 g%	Hct < 33%

Anemia is either directly or indirectly top suspect for 40% of maternal deaths in India. When the Hb level drops below 5 g/dl, maternal mortality rate (MMR) increases by 8 to 10 times. Maternal mortality can be significantly decreased through the early identification and effective management of anemia in pregnancy [8].

The "Knowledge, Attitude, and Practice (KAP)" paradigm is the model most frequently used to explain how individual knowledge and beliefs influence changes in health behavior. In order for people to be willing to adopt proactive preventative actions to prevent and treat diseases, this model begins by educating health educators to promote health information and build health attitudes. This theory is widely applied in the management and public health domains due to its efficacy in the area of behavior change. such is the community's management of chronic diseases.

2. Objectives:

Primary Objective:
- To determine knowledge, attitude and practice levels regarding anemia among pregnant women.
- To identify the association between the participants knowledge, attitude and practices with their socio-demographics and antenatal characteristics.

Secondary Objectives:
- To educate women about anemia during pregnancy, validated leaflets are being disseminated.
- To assess the relationship between hemoglobin level and Gravida.
- To assess the correlation of Age and Education with KAP.

- To assess the association of literacy rate with anemia.
- To assess the correlation of age with hemoglobin.

3. Materials and Methods

3.1 Period of Study

The study period was 6 months (October 2022–March 2023). Prospective data was collected from registered pregnant women attending an antenatal clinic, and the result was analyzed to study the knowledge, attitude, and practice of anemia among expecting mothers.

3.2 Type of Study

The prospective descriptive study was conducted to assess the level of knowledge, attitude, and practice of anemia among pregnant women.

3.3 Study Population

The total study sample consisted of **160** pregnant women aged between 18-40 years attending the outpatient department (OPD).

3.4 Study Procedure

This study used a validated questionnaire to assess patient awareness and perception of anemia in pregnant women, and validated patient information leaflets were provided to improve the patients' understandings.

3.5 Questionnaires

We asked questions in regional tongues like Gujarati and Hindi although the surveys were written in English. Data on the socio-demographic profiles of the participants, including age, education, occupation, and household income, were gathered using a standardized questionnaire. The questionnaire also asked about antenatal features, such as gestational age, trimester, the number of children, the years between children, and hemoglobin level. There were 19 knowledge, 10 attitude, and 12 practice questions pertaining to anemia, its common cause, indications and symptoms, and treatment and prevention. For each question in the knowledge, attitude, and practice sections, frequency analysis was calculated using the percentages of true/false responses for the knowledge section, agree/disagree responses for the attitude section, and yes/no responses for the practice section. 1 point was awarded for a correct response in the knowledge portion and 0 for an incorrect one. In the attitude area, positive replies received 1 point, while negative ones received 0. In the practice portion, right answers received a score of 1, while wrong responses received a score of 0. The respondents' overall knowledge, attitude, and practice portions were evaluated using a sum score outcome, which is divided into three categories: good, moderate, and low. A score of 50% or less was classified as low level, a score of 51-70% as medium level, and a score of 71% or more as good level.

3.6 Study Site

The study was conducted in the "Obstetrics & Gynecological outpatient department of MatrushreeRamuba Tejani and MatrushreeShantaba Vidya Hospital, Surat (SDA Diamond Hospital)"

3.7 Inclusion Criteria

- All pregnant women attending OPD from age group between 18-40.
- Willing to take part in survey
- Women with one or more than one pregnancy.

3.8 Exclusion Criteria

- Nursing mothers.
- Women who are admitted to wards.
- Women who have a bleeding disorder.
- Antepartum hemorrhage.

3.9 Data Collection Form

A validated questionnaire had been used that contained socio-demographic details of the patient, followed by the 19 questions of knowledge, 10 questions of attitude, and 12 questions of practice.

3.10 Statistical Analysis

MS EXCEL was used to compile the data and analyze it for counts and percentages. For continuous variables, the mean was computed.

3.11 Planning of the study
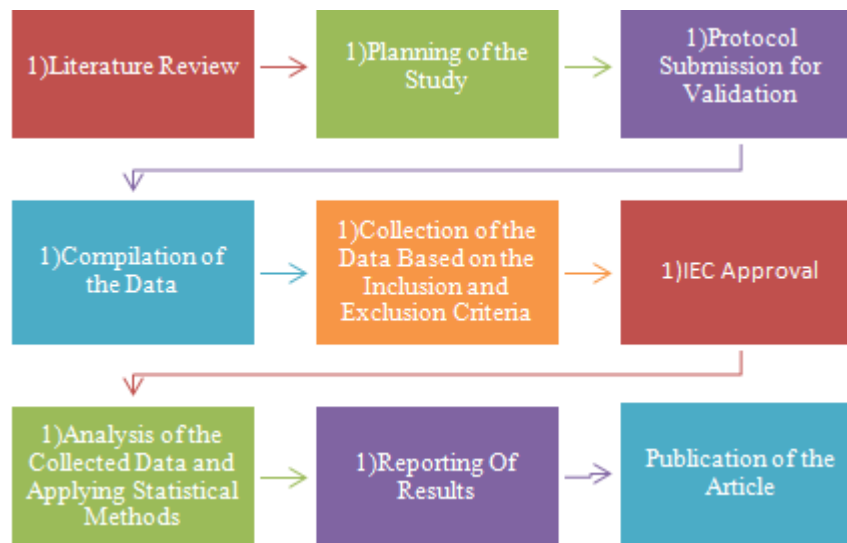
4. Results

Socio-demographic and antenatal characteristics:
The socio-demographic characteristics of the study respondents are presented in the table. The sample population included 160 pregnant women who visited the gynecological OPD of Diamond Hospital, Surat. The majority of the respondents were in the age group 21–30 years, i.e., 80%, while 8.13% belong to the 18–20year age group, and 11.88% of women are in the 31–40year age group. Out of 160 respondents, 10.63% were graduates and above, 25% were undergraduates, 45.63% studied between 8th grade and 10th grade, 13.13% studied less than 8th grade, and only 5.63% were illiterate. The majority of the respondents were unemployed or housewives, i.e., 95%, and only 5% were employed and working women. The majority of the pregnant women were in the 3rd trimester, i.e., 60%, while 13.75% and 26.25% were in the 1st and 2nd trimesters, respectively. 56.25% of pregnant women were mildly anemic, i.e., (9–10.9 g/dL), 33.75% were non-anemic (>11 g/dL), and 10% were moderately anemic (7-8.9 g/dL). The majority of participants were mixed in diet, i.e., 78.13%, whereas only 21.88% were vegetarian.

Out of 160 respondents, the majority (44.38%) were in the first gravida, 36.25% were in the second gravida, whereas 17.50% and 1.88% were in the third and fourth gravida, respectively. It was found out that 56.25% were Primi, i.e., didn't have any children; 43.13% had 1 or 2 children; and 0.63% had more than or equal to 3 children.

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Table 2: Socio-demographic and antenatal characteristics of enrolled pregnant women attending ante-natal care at Diamond Hospital, Surat. (n=160)

Sr. No.	Characteristics	No. of Sample (N=160)	Percentage (%)
1	**Age**		
	18-20	13	8.13%
	21-30	128	80%
	31-40	19	11.88%
2	**Anaemic Status**		
	Non anaemic ($\geq 11 g/dl$)	54	33.75%
	Mild ($9 - 10.9\ g/dl$)	90	56.25%
	Moderate ($7 - 8.9\ g/dl$)	16	10%
	Severe ($< 7\ g/dl$)	0	0%
3	**Education Status**		
	Illiterate	9	5.63%
	<8th std	21	13.13%

	8th-10th std	73	45.63%
	Undergraduate	40	25%
	Graduate & above	17	10.63%
4	**Occupation**		
	Employed	8	5%
	Unemployed	152	95%
5	**Gravida Status**		
	G1	71	44.38%
	G2	58	36.25%
	G3	28	17.50%
	$\geq G4$	3	1.88%
6	**Gestational Week**		
	First trimester	22	13.75%
	Second trimester	42	26.25%

	Third trimester	96	60%
7	**No. of Children**		
	Primi	90	56.25%
	1-2	69	43.13%
	≥ 3	1	0.63%
8.	**Food Habits**		
	Vegetarian	35	21.88%
	Mixed	125	78.13%

Out of 160 participants, 54 (33.75%) non-anemic, 90 (56.25%) were mildly anemic, 16 (10%) were moderately anemic and 0% were severe anemic as shown in figure below:
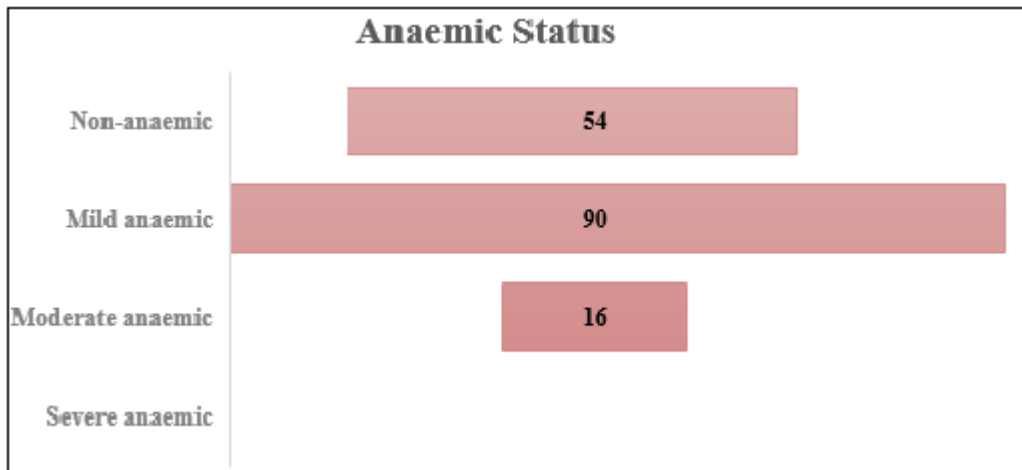
Figure 1: Anemic Status

Table 3: Age of study population and association with anemia

Age	Non-Anaemic ($\geq 11 g/dl$)	Mild ($9 - 10.9\ g/dl$)	Moderate ($7 - 8.9\ g/dl$)	Severe ($< 7\ g/dl$)	Total (N=160)
18-20 years	5 (3%)	7 (4%)	1 (1%)	0 (0%)	13 (8%)
21-30 years	45 (28%)	70 (44%)	13 (8%)	0 (0%)	128 (80%)
31-40 years	5 (3%)	12 (8%)	2 (1%)	0 (0%)	19 (12%)

The total study subjects were 160 pregnant women. Among them, 105 pregnant women (66%) suffered from mild, moderate, and severe anaemia. 80% of pregnant women were in the 21–30 age group among participants. This finding indicates that the majority of Anti-Natal cases are under the age of 30.

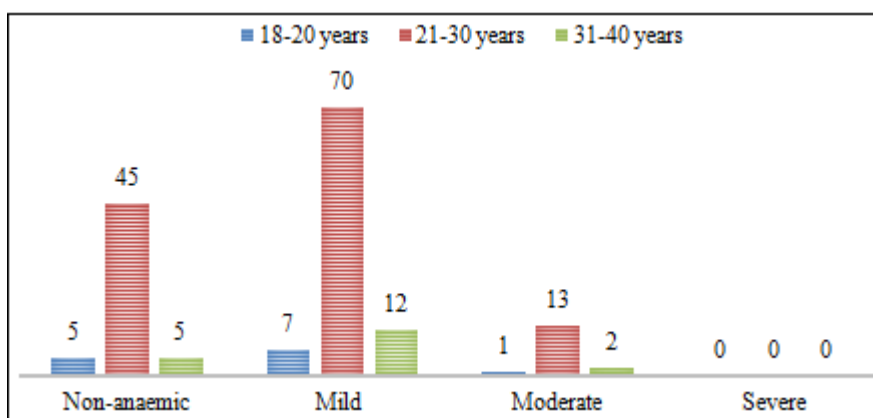**Age of study population and association with anaemia:**

Figure 2: Age of study population and association with anemia

Table 4: Distribution of pregnant women according to anemic status and trimesters

Trimester	Non-Anaemic ($\geq 11 g/dl$)	Mild ($9 - 10.9\ g/dl$)	Moderate ($7 - 8.9\ g/dl$)	Severe ($< 7\ g/dl$)	Total (N=160)
First trimester	7 (4.38%)	14 (8.75%)	1 (0.63%)	0 (0%)	22 (13.75%)
Second trimester	17 (10.63%)	25 (15.63%)	0 (0%)	0 (0%)	42 (26.25%)
Third trimester	30 (18.75%)	51 (31.88%)	15 (9.38%)	0 (0%)	96 (60%)

Out of 160 participants, the majority of the participants were enrolled in third trimester 96 (60%), followed by second trimester 42 (26.25%) and first trimester 22 (13.75%). The prevalence of anemia increased with the duration of pregnancy. Majority of mildly and moderately anemic were from the 3rd trimester as shown in figure below.
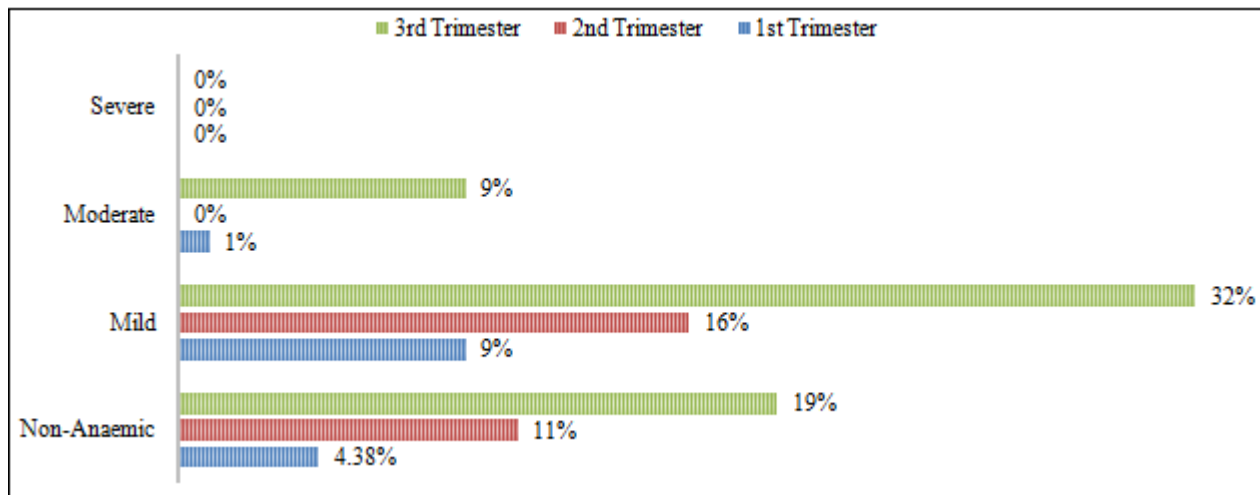
Figure 3: Distribution of pregnant women according to anemic status and trimesters

Table 5: Literacy rate among study population and association with anemia:

Education Status	Non-Anaemic	Mild	Moderate	Severe	Total (N=160)
Illiterate	0 (0%)	9 (6%)	0 (0%)	0 (0%)	9 (6%)
<8th std	8 (5%)	12 (8%)	1 (1%)	0 (0%)	21 (13%)
8th-10th std	26 (16%)	36 (23%)	11 (7%)	0 (0%)	73 (46%)
Undergraduate	12 (8%)	25 (16%)	3 (2%)	0 (0%)	40 (25%)
Graduate & above	8 (5%)	8 (5%)	1 (1%)	0 (0%)	17 (11%)

Checking the status of anaemia as per the literacy rate among pregnant women, we found out that the majority of 73 (46%) of the participants studied 8th–10th grade, 40 (25%) were undergraduates, 21 (13%) studied less than 8th grade, 17 (11%) were graduates and above, and only 9 (6%) were illiterate. The participants with higher levels of education were shown to be less anaemic in the figure below, which is closely associated with anaemia during pregnancy. Since all of the women in our study were taking iron supplements from the first trimester, we didn't find any with severe anaemia
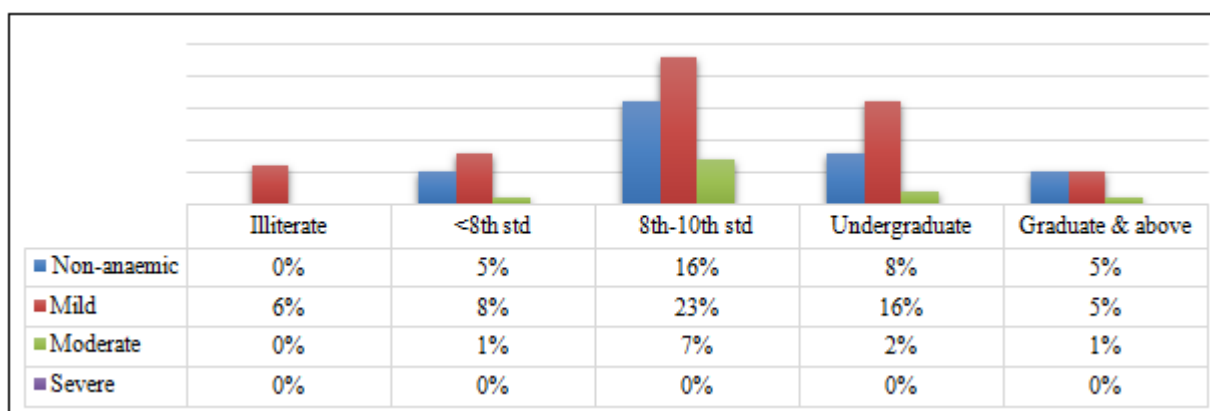

Figure 4: Literacy rate among study population and association with anemia

Table 6: Correlation of age and knowledge attitude practice:

Age	Knowledge (mean %)	Attitude (mean %)	Practice (mean %)	Average (%)	Total Sum Score
18-20	40.08%	39.23%	47.44%	42.25%	Low
21-30	55.34%	53.83%	52.20%	53.79%	Moderate
31-40	47.91%	57.37%	54.82%	53.37%	Moderate
TOTAL				49.80%	LOW

Sum score outcome: *Low level*: ≤ 50%, *Moderate level*: 51 − 70%, *Good level*: ≥ 71%)

Correlating age with knowledge, attitude and practice, our study shows that majority 128 (80%) of pregnant women were from 21-30 years of age group, 19 (12%) were from 31-40 years of age and 13 (8%) were from 18-20 years. From the study it can also be concluded that the age of the respondents showed significant association to their comprehensive knowledge. The participants from age group 31-40 years were have more knowledge, attitude and practice (53.367%) as compared to that of 18-20 years and 21-30 years.
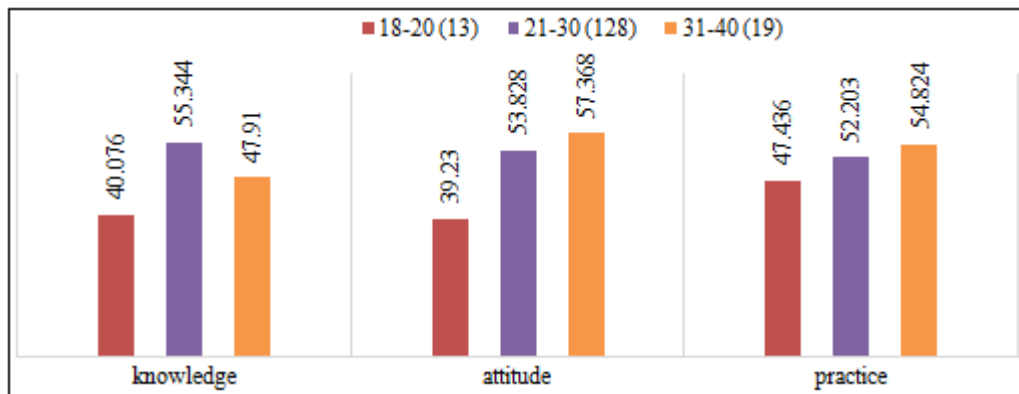

Figure 5: Correlation of age and KAP

Table 7: Correlation of education and KAP

Education	Knowledge (Mean %)	Attitude (Mean %)	Practice (Mean %)	Total %	Total Sum Score
Illiterate	19.87%	21.111%	44.44%	28.47%	Low
<8th std	45.521%	52%	51.25%	49.59%	Low
8th-10th std	51.482%	51.698%	52.968%	52.04%	Moderate
Undergraduate	63.542%	58.5%	53.04%	58.36%	Moderate
Graduate & more	69.65%	65.29%	54.41%	63.11%	Moderate
Total				50.318%	LOW

Sum score outcome: *Low level*: ≤ 50%, *Moderate level*: 51 − 70%, *Good level*: ≥ 71%)

Correlating education with knowledge, attitude, and practice, our study shows that the graduated and above participants had more knowledge, attitude, and practice as compared to others, i.e., 63.11%. And it can also be concluded that education is closely associated with anaemia during pregnancy. The higher the education, the more knowledge, attitude, and practice, as shown in the figure below.
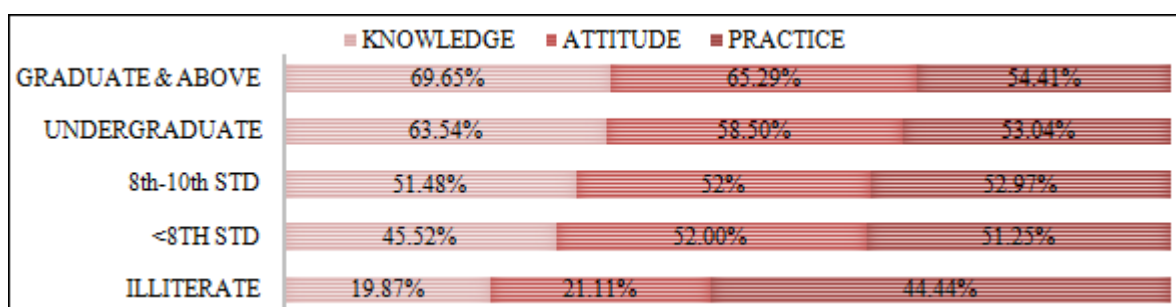

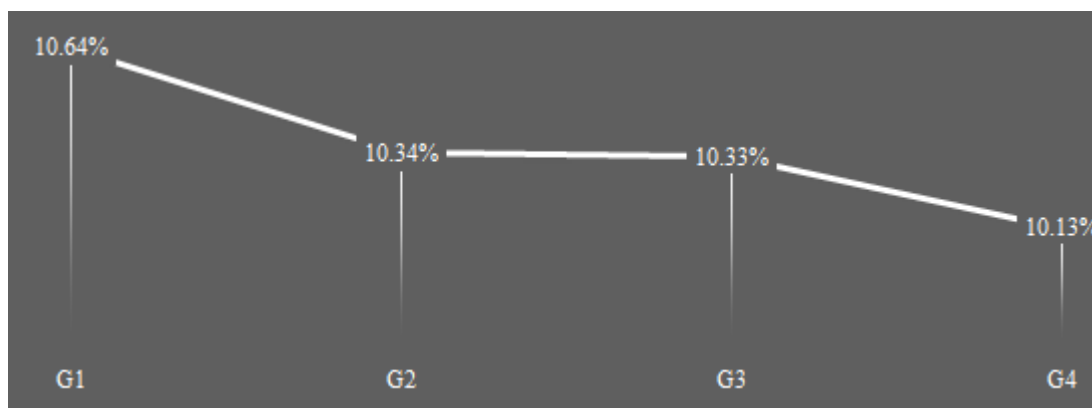**Figure 6:** Correlation of education and KAP

Figure 7: Correlation of Hb level with Gravida

The mean percentage of participants in Gravida 1 was 10.64%; in Gravida 2, it was 10.34%, followed by 10.33% and 10.13% of the participants in Gravida 3 and 4, respectively. It is clearly seen that as the gravida increases, the level of haemoglobin decreases. Many studies have shown that there is a correlation between gravida and haemoglobin levels, and our study succeeded in proving that.

Table 8: Respondents responses to knowledge questions on Anaemia during Pregnancy

| Knowledge	Correct	Incorrect
1) Anaemia is a condition that arises when there is lack of RBC.	32.50%	67.50%
2) Anaemia is defined as having less than 11g/dl haemoglobin in the blood.	31.25%	68.75%
3) The most common causes of anaemia during pregnancy are iron deficiency, vitamin B12 deficiency and folate acid deficiency.	28.75%	71.25%
4) Pregnant women require more iron than non-pregnant women.	65%	35%
5) Anaemia can be caused by worm infection.	23.75%	76.25%
6) Anaemia can be caused by a lack of iron in the diet during pregnancy.	45%	55%
7) One of the causes of anaemia during pregnancy is a gap of less than two years between pregnancies.	51.88%	48.13%
8) Pale face or tongue is a sign of anaemia.	43.13%	56.88%
9) Anaemia symptoms include fatigue and weakness.	73.13%	26.87%
10) Anaemic pregnant women are at risk of losing their lives during or after pregnancy.	28%	71.88%
11) Anaemia increases risk of preterm delivery and postpartum maternal infections.	23.75%	76.25%
12) Pregnancy anaemia results in low-birth-weight babies (less than 2.5 kg)	45.63%	54.38%
13) Iron-rich diets can help avoid anaemia during pregnancy.	66.88%	33.13%
14) Meat is from animal sources that are rich in iron.	58.13%	41.88%
15) Green, leafy vegetables like spinach and cabbage are high in iron.	94.37%	5.63%
16) Intake of citrus fruits such as lemons and oranges during the main meal can enhance iron absorption.	70.63%	29.38%
17) Drinking coffee or tea will decrease iron absorption if taken during the main meal can enhance iron absorption.	35.63%	64.38%
18) Anaemic pregnant women should take iron supplements on a daily basis to prevent anaemia.	58.13%	41.88%
19) Regular medical check-ups during pregnancy are important.	92.50%	7.50%
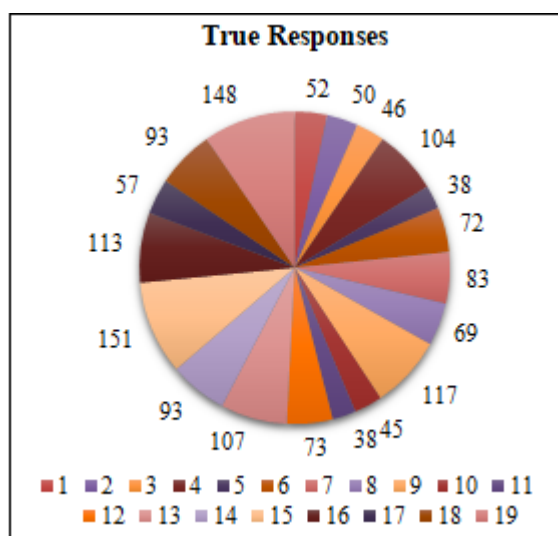
Figure 8: Respondents responses to Knowledge questions

Table 9: Respondents Responses to attitude questions on anaemia during pregnancy

| Attitude	Agree	Disagree	Don't Know
1. Anaemia makes pregnant women too tired to work.	82.50%	5.63%	11.88%
2. Regular ANC visit is good to prevent anaemia.	91.25%	0.00%	8.75%
3. Iron supplements can affect mother and foetus health.	71.25%	4.38%	24.38%
4. Drinking tea, coffee or milk can affect iron absorption.	41.25%	10.63%	48.13%
5. Treating anaemia during pregnancy is good for the baby.	79.38%	0.63%	20.00%
6. Gap duration during pregnancies is important to prevent anaemia.	49.38%	1.25%	49.38%
7. The combination of iron supplements and balanced diet during pregnancy is able to treat anaemia.	36.88%	0.00%	63.13%
8. Any pregnant women can be affected by anaemia.	33.75%	1.88%	64.38%
9. Pregnant women should take iron tablets even if they adopt balanced diet during pregnancy.	38.13%	0.63%	61.25%
10. It is impossible to prevent anaemia during pregnancy.	42.50%	8.75%	48.75%
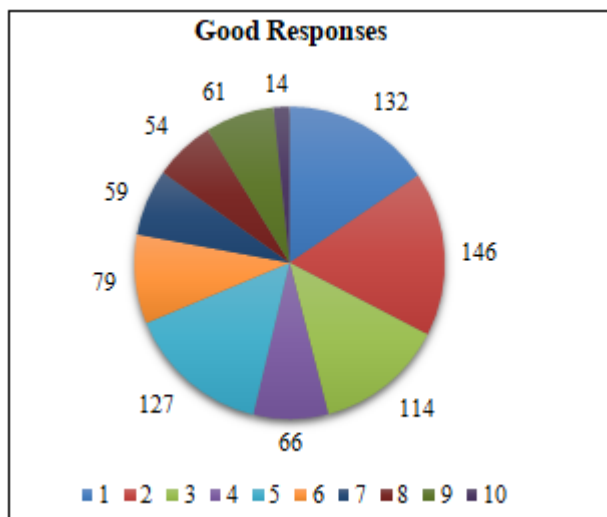
Figure 9: Respondents response to Attitude questions

Table10: Respondents responses to practice questions on anaemia during pregnancy

| Practice	Positive	Negative
1. Have you changed your normal dietary patterns during pregnancy?	**69.38%**	30.63%
2. Are you a vegetarian?	29.38%	70.63%
3. Do you vomit in early pregnancy?	35%	65%
4. Do you have pica (such as ice, mud or charcoal) during pregnancy?	61.88%	38.13%
5. Do you eat meat/ poultry/ fish in your diet every day during pregnancy?	17.50%	82.50%
6. Are you taking citrus fruits or fruit juice during the main meal every day during pregnancy?	71.25%	28.75%
7. Do you include green leafy vegetables in your daily diet during pregnancy?	95.63%	4.38%
8. Do you skip meals during pregnancy?	70%	30%
9. Do you drink tea or coffee during the main meal during pregnancy?	52.50%	47.50%
10. Do you use cooking utensils made of iron during cooking?	26.25%	73.75%
11. Are you taking iron tablets daily before enrolling in a health clinic?	15.63%	84.38%
12. Do you take any supplements or traditional medicine during pregnancy?	97.50%	2.50%
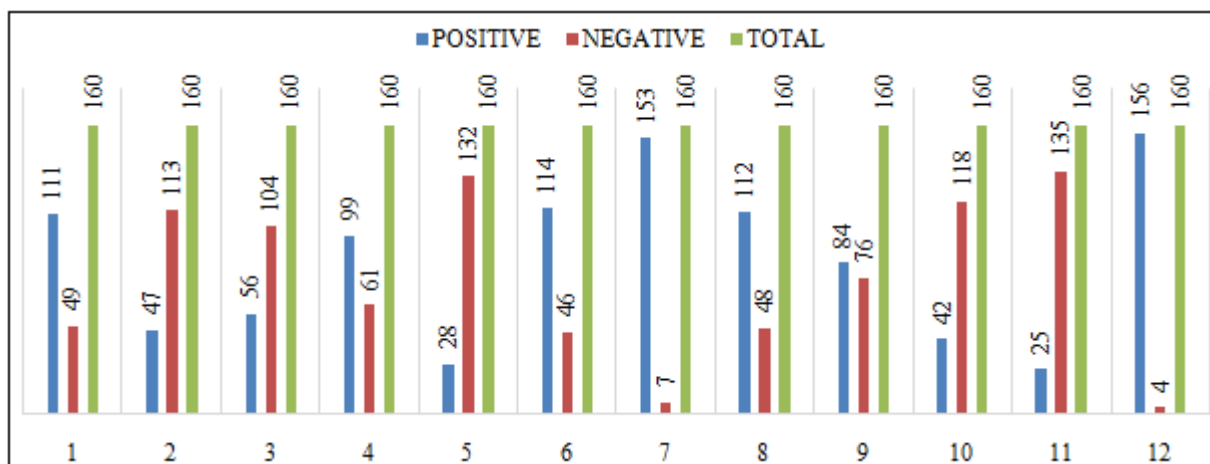
Figure 10: Respondents responses to Practice questions

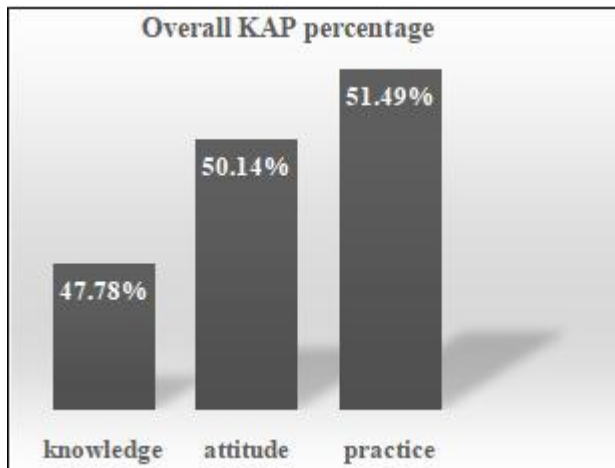**Overall assessment of knowledge, attitude and practice among pregnant women**

Figure 11: Overall KAP percentage

- The participants' overall evaluation of knowledge, attitude, and practice was low, as indicated by the sum score outcome.
- According to SSO, knowledge was low (47.78%), attitude was also low (50.14%), and practice was moderate (51.49%).
- An overall low level of KAP was demonstrated by the mean percentage of knowledge, attitude, and practice, which was 49.8021%.

5. Discussion

In all, 160 participants' mean percentages of knowledge, attitudes, and practices on anemia among pregnant women at SDA Diamond Hospital were 49.8021%, which is considered low by sum score results.

The prevalence of anemia in this study population using a cut off level of Hb <11 g/dl was 65.63% (105/160). This study is almost consistent with Prevalence of anemia among pregnant women attending antenatal clinic at RHTC and CAIMS Hospital, Karimnagar, Telangana, India (58.36%). According to similar data from the WHO, up to 56% of all women in underdeveloped nations are anemic. Similarly, in the prevalence of anemia and associated factors in pregnant women in a rural Indian community, the study shows high prevalence of anemia (74.80%) among pregnant women.

Our study reveals that the maximum participant of pregnant women was in age group of 21-30 years (80%) at SDA Diamond Hospital, Surat. The similar study was conducted in RHTC & CAIMS hospital, India, found that maximum (77.3%) subjects were between 20 to 29 years. Similarly, our study shows contrast with the KAP study of mothers with anemia in pregnancy (Yousuf* S, et al.) in which their study shows majority of population was in the age group of 25-35 years (50%). The similar study was conducted in Aurangabad city, India by (Lokare PO) found that maximum (87.2%) subjects were between ages above 20 to 30 years.

Anemia among age group 21 to 30 years were in total 51.88% (mild 44.0%, moderate 8% & severe 0%). Among the education category, majority participants suffering with anemia were 8th – 10th (45.63%), as most of the participants (73/160) studied between 8th-10th. But it is seen that as the education increases the chances of anemia decreases. Similarly, the study by (Rajamouli J et al) shows among the education category, majority were illiterates (46.4%). The similar study done in 7 states by (AGARWAL et al) revealed that the anemia in illiterates among pregnant women was highest in M.P(68%) followed by 46.3%, 45.3%, 30.7%, 28.7%, 8.8% and 1.3% in the states of Orissa, Assam, Haryana, Tamil Nādu, H.P and Kerala, respectively.

Our study shows higher prevalence of anemia (60%) seen in 3rd trimester pregnant women, as majority were enrolled in 3rd trimester (96/160). But according to the mean percentage the higher prevalence of anemia (26.25%) seen in 2nd trimester pregnant women, who were (42/160). The same explanation was given by similar study, with the mean gestational age of 22 weeks in this study; physiologic haemo dilution in pregnancy may explain the increased prevalence of mild anemia.

The incidence of anemia in pregnancy was seen to increase as the parity level of the women increased, with primigravida the mean percentage of hemoglobin was 10.64% while in multigravida 10.34%, 10.33% and 10.13% of Gravida 2, Gravida 3 and Gravida 4, respectively. The similar study done in Raichur by (Ramesh BH et al,) revealed that with primigravida women showing an incidence of anemia of only 46.00% while multigravida women showed a much higher incidence of 70.67%.

The average hemoglobin levels of primigravida women were considerably higher than that of multigravida women.

6. Conclusion

The risk of anemia during pregnancy increases with increasing gravidity, and there is a significant association between the incidence of anemia and gravidity. Therefore, multigravidity can be considered a risk factor for anemia during pregnancy.

This study found that there was a lack of knowledge and attitude in rural areas due to people's low levels of education and age as well as their economic factors, which significantly influenced their practices. This study was conducted because there haven't been many studies on knowledge, attitude, and practices regarding anemia among pregnant women in Gujarat, India.

The study also showed that the average hemoglobin level of pregnant women in Surat needed to be improved.

7. Strengths

1) Few studies have been conducted on knowledge, attitude and practices regarding anemia among pregnant women in India. This study was conducted in Surat, Gujarat, India where we were unable to locate any research articles on the subject.

2) Qualitative interviews were used as the methodology for data collection, as they are the preferred method in KAP studies because they let participants express themselves freely and are helpful for gathering in-depth information and comprehending social processes.

3) In addition, the local language, like Gujarati or Hindi, was used to collect the data.

4) Another strength of this study was that the data were collected from gynecological department of SDA Diamond Hospital, one of the largest semi-government hospitals in Nana Varaccha, Surat, Gujarat. Gynecological department of SDA Diamond has the largest influx of women, with various health problems.

8. Limitations

1) Majority of the pregnant women had travelled long distances and waited long for their medical examinations by doctors. Due to this reason, most of the women were reluctant to participate in this study and those who participated wanted to finish interview as early as possible. These barriers resulted in affecting an in-depth exploration of the phenomena.

2) The major limitation of this study was that the place where women were recruited for interviews was very busy and crowded.

3) Another potential drawback of this study was the extremely small sample size and the fact that it was carried out in a specific hospital with only lower middle-class or low-income female patients who lacked education and had extremely low levels of knowledge, attitude, and practice.

Conflict of Interest
The authors declare no conflict of interest.

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