CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187

Avalable online at: http://www.iajps.com *Research Article*

PREVALENCE AND RISK FACTORS OF ANEMIA AMONG PREGNANT WOMEN IN FAMILY MEDICINE DEPARTMENT AT KFAFH

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Article Received: November 2020 **Accepted:** December 2020 **Published:** January 2021

Abstract:

Background: *Anemia is one of the common medical conditions among pregnant women. In this study, we aimed to determine the prevalence of anemia among pregnant females attending the Family Medicine Department (FMD) at KFAFH and to assess the risk factors contributing to it during pregnancy.*

Methods: *A retrospective cohort study was conducted among all pregnant women who visited the FMD at KFAFH on Monday. From April 2018 to April 2019*

Results: *The prevalence of anemia was observed to be 409 (40%). Maternal anemia was significantly associated with some risk factors, such as the gravidity, gestational age, antenatal care visit, history of abortion, history of bleeding in the current pregnancy, iron and folic acid supplements consumption, and planning of pregnancy were statistically significant between anemic and non-anemic women. However, we noticed that the age group and BMI were not statistically significant (p-value < 0.05).*

Conclusions: *To summarize, there is a significantly high prevalence of anemia among pregnant women who visited FMD in KFAFH, and such associated risk factors were determined.*

Keywords: *Anemia, Anemic pregnant women, the prevalence of anemia.*

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Please cite this article in press Manal Al-Enezi et al, ***Prevalence And Risk Factors Of Anemia Among Pregnant Women In Family Medicine Department At Kfafh.,*** *Indo Am. J. P. Sci, 2021; 08(1).*

INTRODUCTION:

Anemia is one of the common medical conditions among pregnant women. It is considered a global public health problem with adverse maternal and fetal outcomes that affect both developing and developed countries. Anemia during pregnancy is considered a significant cause of morbidity and mortality of pregnant women. It is associated with a high rate of maternal and perinatal mortality, with increased risk of premature delivery, low birth weight and other adverse outcomes. [1, 2]

According to the World Health Organization (WHO) report of 2017, anemia's prevalence was estimated to be 40.1% among pregnant women worldwide; almost 46% among pregnant women in Saudi Arabia, 46 %. [3]

Anemia can be divided into two types, acquired or hereditary. hemoglobinopathies such as sickle cell anemia, thalassemia are considered as hereditary anemia. In contrast, deficiency of nutrients (iron, folate, and vitamin B12), anemia caused by blood loss, infectious and chronic disease anemia, acquired hemolytic anemia, and aplastic anemia can be considered as acquired anemia. In pregnancy, the most frequently encountered anemia is Iron Deficiency Anemia (IDA) [2, 4]

According to the WHO, anemia in pregnancy in any trimester is defined as hemoglobin (Hgb) concentration less than 11g/dL throughout pregnancy, which decreases the oxygen-carrying capacity of red blood cells to tissues [1, 5]. Anemia during pregnancy is considered severe when Hgb level is less than 7.0 g/dL, moderate when hemoglobin falls between 7.0 and 9.9 g/dL, and mild when the Hgb level is from 10.0 to 11 g/dL [1, 2, 4].

The primary care physician who provides the first contact point for a patient with undiagnosed health issues and continuing care of varied medical conditions; plays an essential role in the identification and management of anemia. Although such risk factors such as nutritional, genetic, and infectious and chronic diseases contribute to risk factors for anemia among pregnant women, the physician needs to understand these factors that could be of regional interest. Besides, pre-pregnancy counselling, dietary advice and therapy are crucial for ensuring the best pregnancy outcomes.

Therefore, the present study aimed to determine the prevalence of anemia among pregnant females attending the Family Medicine Department (FMD) at KFAFH and to assess the risk factors contributing to it during pregnancy.

MATERIALS AND METHODS:

Study Setting:

The study was conducted at the FMD of King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia, from April 2018 to April 2019.

Study design:

A retrospective cohort study was conducted among pregnant women who were visiting the FMD at KFAFH.

Population:

Our study population is all pregnant women who visited the FMD at KFAFH on Monday clinic and met our criteria over one year from April 2018 to April 2019. The estimated sample size is 1027 participants.

Inclusion Criteria:

- Women of reproductive age (18 to 45) years old.
- Hemoglobin (Hb)≤ 11 g/dL %

Exclusion Criteria:

- Pregnant women with hemolytic anemia, anemia due to hemoglobinopathies will be excluded from the study.

Data Collection:

The data were obtained from the electronic medical record and patients' charts for the pregnant women attending the antenatal clinic in FMD at KFAFH, as the results of investigations were collected each visit and kept for a while. Data obtained consisted of some demographic and maternal characteristics such as age, gravidity, gestational age, previous planning of pregnancy, hemoglobin concentration, weight, height and BMI at booking and the screening status of previous abortion or current bleeding, and iron and folic acid supplementation consumption**.**

Statistical Analysis:

The collected data were analyzed by using the Statistical Package for Social Sciences version 22.0 (SPSS Inc., Chicago, USA). Continuous variables were presented as the mean ± standard deviations (SDs). In contrast, categorical variables are denoted as numbers or percentages where appropriate, chi-square and one Way-ANOVA tests were used. Results were considered statistically significant if (p-values < 0.05).

RESULT:

A sample of 1027 participants was obtained with

relevant details. 409 (40%) of pregnant females have anemia. Among those with anemia, 30 (7%) have severe anemia, 278 (68%) have moderate anemia, and the remaining 101 (25%) have mild anemia.

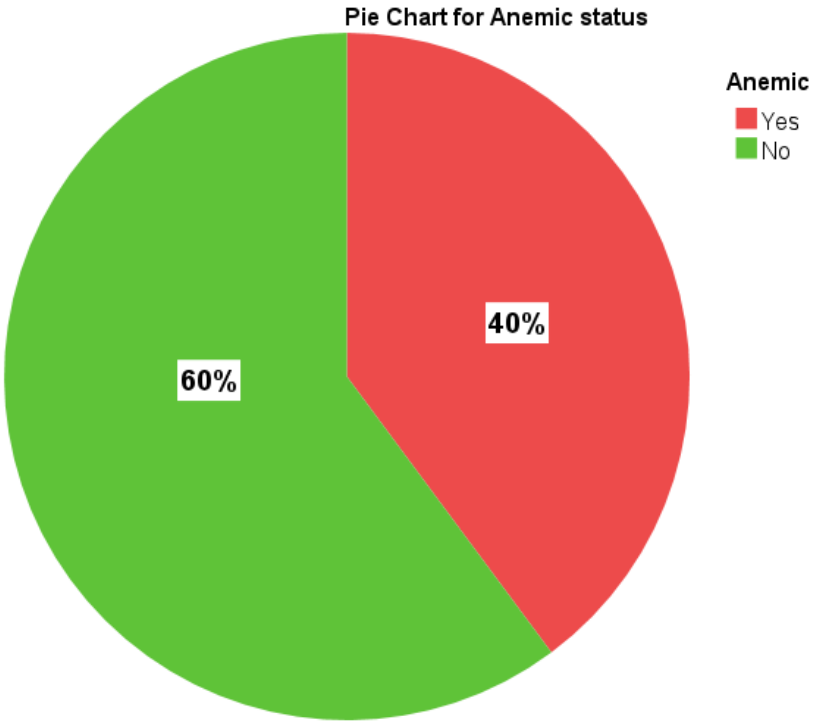

Figure 1: Prevalence of anemia among antenatal patients

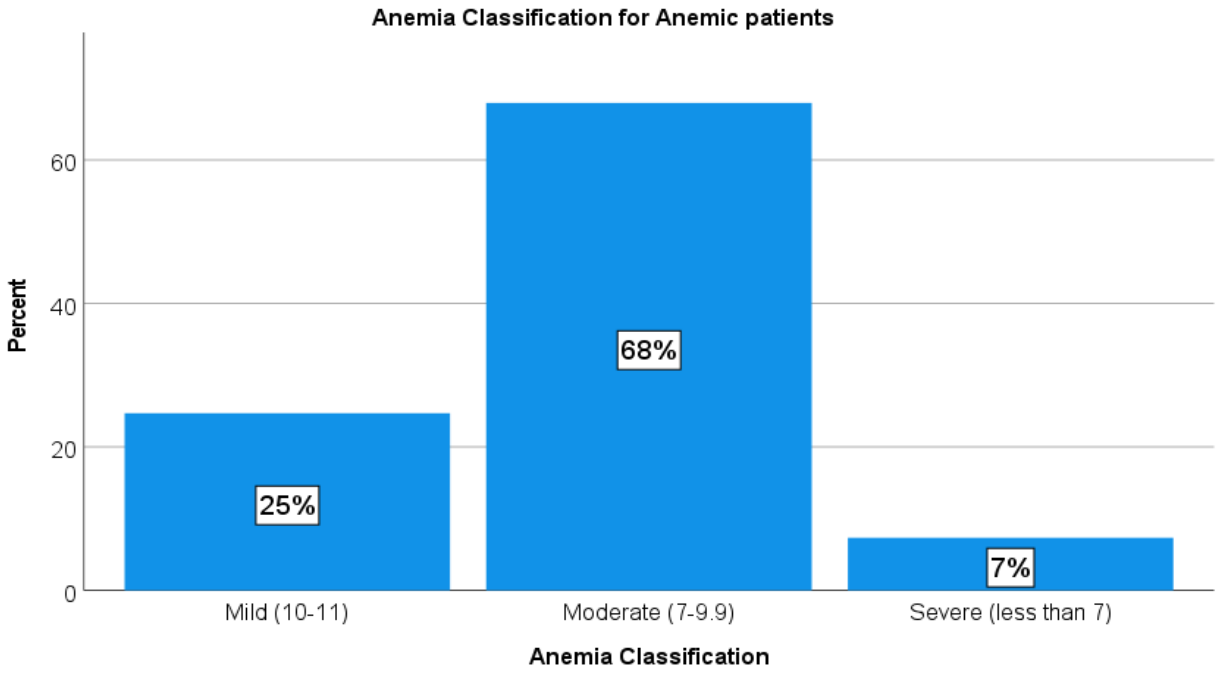

Figure 2. Anemia classification among anemic patients

Table 2. Presents the demographic and maternal characteristics of the anemia group versus the non-anemia group and chi-square test or t-test to compare two subgroups in terms of these characteristics.

It was observed that the majority (47 %) of the participants were between 26-35 years old. Regarding the gravidity and gestational age, it was found out that 217 (53 %) of the participants were multigravida, and 246 (60 %) of the participants were in the 2nd trimester.

We found no statistically significant difference between anemic and non-anemic patients in terms of age (p = .36), weight (p = .57), height (p = .10), or BMI (p = .74).

Compared to non-anemic patients, anemic patients found to be statistically more likely to be primigravida (47%), 1st or 3rd trimester (11% and 29% respectively), have 2-3 visits (64%), have history of abortion (53%), have history of bleeding in current pregnancy (69%), have planned pregnancy (86%). Non-anemic patients are statistically more likely to receive iron supplementation (75%) and folic acid supplementation (36%) compared to anemic patients.

In terms of evaluating the associated risk factors, we found that the differences in the gravidity, gestational age, antenatal care visit, history of abortion, history of bleeding in the current pregnancy, receiving iron and folic acid supplements, and planning of pregnancy were statistically significant between the two groups as (p-values < 0.05)

Table 2. Demographic and maternal characteristics

Demographic and maternal characteristics	Frequency (%) or Mean ± SD [range]			χ^2 or t-test
	Entire sample (n = 1027)	Anemic (n = 409)	Non-Anemic (n = 618)	
Age (years)	30.76 ± 7.33 [18 – 45]	31.02 ± 7.13 [18 – 45]	30.59 ± 7.46 [18 – 45]	t(1025) = 0.92, p = .36
Age Group				$\chi^2(2) = 3.83$, p = .15
18-25	262 (26 %)	91 (22 %)	171 (28 %)	
26-35	464 (45 %)	194 (47 %)	270 (44 %)	
36-45	301 (29 %)	124 (31 %)	177 (28 %)	
Gravida				$\chi^2(1) = 27.07$, p < .001
Primi-gravidity	383 (37 %)	192 (47 %)	191 (31 %)	
Multi- gravidity	644 (63 %)	217 (53 %)	427 (69 %)	
Gestational Age				$\chi^2(2) = 46.21$, p < .001
1st Trimester	80 (8 %)	44 (11 %)	36 (6 %)	
2nd Trimester	738 (72 %)	246 (60 %)	492 (80 %)	
3rd Trimester	209 (20 %)	119 (29 %)	90 (14 %)	
Antenatal Care Visits				$\chi^2(2) = 161.48$, p < .001
1 visit	247 (24 %)	26 (6 %)	221 (36 %)	
2-3 visits	441 (43 %)	262 (64 %)	179 (29 %)	
4 and more visits	339 (33 %)	121 (30 %)	218 (35 %)	
History of Abortion				$\chi^2(1) = 117.00$, p < .001
Yes	346 (34 %)	218 (53 %)	128 (21 %)	
No	681 (66 %)	191 (47 %)	490 (79 %)	
History of bleeding in current pregnancy				$\chi^2(1) = 247.08$, p < .001
Yes	401 (39 %)	280 (69 %)	121 (20 %)	
No	626 (61 %)	129 (31 %)	497 (80 %)	
Received iron supplementation				$\chi^2(1) = 295.71$, p < .001
Yes	556 (54 %)	87 (21 %)	469 (76 %)	
No	471 (46 %)	322 (79 %)	149 (24 %)	
Received Folic Acid supplementation				$\chi^2(1) = 35.93$, p < .001
Yes	298 (29 %)	76 (19 %)	222 (36 %)	
No	729 (71 %)	333 (81 %)	396 (64 %)	

Hemoglobin	10.81 ± 1.85 [3.5 – 13.5]	8.86 ± 1.35 [3.5 – 11]	12.09 ± 0.56 [11 – 13.5]	t(1025) = 53.14, p < .001
Weight (kg)	79.70 ± 14.48 [46 – 115]	79.38 ± 14.70 [46 – 109]	79.90 ± 14.33 [54 – 115]	t(1025) = 0.57, p = .57
Height (cm)	159.26 ± 8.76 [143 – 179]	158.70 ± 8.76 [143 – 179]	159.62 ± 8.75 [146 – 177]	t(1025) = 1.66, p = .10
BMI	31.70 ± 6.66 [14.68 – 49.15]	31.78 ± 6.76 [14.68 – 48.59]	31.64 ± 6.60 [19.36 – 49.13]	t(1025) = 0.34, p = .74
Planned pregnancy				$\chi^2(1) = 24.19$, p < .001
Yes	804 (78 %)	57 (14 %)	166 (27 %)	
No	223 (22 %)	352 (86 %)	452 (73 %)	

* Statistical Significant at P<0.05

Table 3. Severity of anemia in three trimester of pregnancy, n = 409

	Severity of Anemia			**χ^2**
Gestational Age	**Mild (10-11)**	**Moderate (7-9.9)**	**Severe (less than 7)**	$\chi^2(4) = 4.70$, p = .32
1st Trimester	7 (16 %)	31 (70 %)	6 (14 %)	
2nd Trimester	62 (25 %)	169 (69 %)	15 (6 %)	
3rd Trimester	32 (27 %)	78 (65 %)	9 (8 %)	

Table 3. Shows the rate of the severity of anemia in three trimesters of pregnancy. We observed no statistically significant differences between three gestational age groups in terms of severity of anemia among 409 patients that had anemia (p = .32). Majority of the patients (65-70%) fall into moderate severity, about a quarter have mild severity (16-27%) and relatively small group (6-14%) have severe anemia. These distributions are similar across three trimesters of pregnancy.

Table 4. Hgb level of three trimesters in pregnancy, n = 409

	Hgb level, Mean ± SD	**One-way ANOVA test**
Gestational Age		
1st Trimester	8.46 ± 1.51	F(2,406) = 2.15, p = .12
2nd Trimester	8.91 ± 1.29	
3rd Trimester	8.89 ± 1.39	

Among anemic women, we found no statistically significant difference in Hgb level between three pregnancy trimesters, p = .12. We found that the mean Hgb levels in three trimesters were 8.46 ± 1.51 g/L, 8.91 ± 1.29 g/L and 8.89 ± 1.39 g/L, respectively (Table 4).

DISCUSSION AND CONCLUSION:

Anemia is one of the most common complications during pregnancy and could cause adverse pregnancy outcomes. In the present study, we estimated the prevalence of anemia among pregnant women and its association with certain risk factors such as demographic factors, maternal risk factors, BMI and other related factors.

The prevalence of anemia was found at 40%. These findings are similar to the findings of Dim's study [7].

Out of the 409 anemic pregnant women we found that the majority, (65-70%) fall into moderate severity (Hgb = 10-11 g/dL), about a quarter anemic cases (16-27%) have mild severity (Hgb = 7-9.9 g/dL), and relatively small group (6-14%) have severe anemia (Hgb < 7 g/dL). Similarly, a report from India in 2010 showed that the majority (50.9%) had moderate anemia, with a mild type of anemia accounting for 30.17%, then severe anemia for 18.9%. [8] Conversely, it is contrasting Asrie's and Lin et al. studies as stated that the mild cases of anemia have a higher rate followed by moderate and severe cases [9, 10].

In the present study, the higher occurrence of anemia was present in the pregnant women's age group between 26-35 years old. These findings were coherent with the results obtained by Lin et al. study and Moghaddam & Barjasteh studies [10, 11]. The

higher prevalence of anemia among relatively middle-aged women is perhaps linked to the lower dietary iron consumption and the additional demand for iron imposed by iron loss during menstruation, pregnancy, and lactation. Previous studies found an association between anemia and age groups; we did not find this association in this study [12].

Evidence from previous literature was reported that recurrent pregnancy is mostly associated with a low level of hemoglobin [13]. That is precisely what we have noticed in the current study; the prevalence of anemia was 47 % and 53 % of primigravida and multigravida subjects, respectively.

In a comparison of the gestational age and Hgb value, we found that the mean of Hgb level slightly increased from early pregnancy (8.46 ± 1.51) to middle pregnancy (8.91 ± 1.29) then turned to become slightly lower in late pregnancy (8.89 ± 1.39). This result is in contrast to a previous study done by Moghaddam & Barjasteh (2015), which noted a reduction in hemoglobin means during the second trimester [11]

During the second trimester, the change in the Hgb level may be related to physiological changes during pregnancy due to plasma dilution. According to Lin et al. study, in the third trimester, the increased plasma volume velocity slows down physiologically. Women may undergo routine antenatal care and iron supplementation, which will elevate the Hgb level [10]. This is precisely what we noticed in our study, as the Hgb was declined in the third trimester.

The finding of this study documented that the main risk factors of being anemic during pregnancy were not planning for pregnancy in advance (86 %), followed by insufficient folic acid and iron supplementation, 81 % & 79 %, respectively. Also, bleeding in the current pregnancy, previous history of abortion, and multigravida are considered essential risk factors, which were 69 %, 53 % & 53 %, respectively. Some of the results were in line with Zekaria's study findings [14, 15], which mentioned that the history of abortion and excessive bleeding were the most typical causes of anemia among their participants.

Previous studies revealed that parity and the birth interval between pregnancies are the most apparent factors linked to anemia. There is no doubt that the higher the parity, the higher the risk of developing anemia in the present pregnancy. Additionally, a meta-analysis from the literature showed that primigravida women were 61% less likely to develop anemia during pregnancy comparing to multigravida women, which could be a consequence of depletion of iron reserves owing to repeated pregnancies [1, 13] Therefore, the relationship between parity and anemia was statistically significant in our study.

To summarize, there is a significantly high prevalence of anemia among pregnant women who visited FMD in KFAFH, and such associated risk factors were determined. It is highly recommended that more effective guidelines regarding antenatal education, pre-pregnancy screening program, awareness campaign, frequent visits to the antenatal clinics, planning for pregnancy in advance and a higher level of knowledge might help people better comply and manage their care by adhering to a healthy lifestyle, developing and maintaining good eating habits, with regular iron and folic acid tablets intake as recommended. Such measures will help reduce the prevalence of anemia and its associated risk factors among pregnant women.

LIST OF ABBREVIATION:

KFAFH	King Fahd Armed Forces Hospital
FMD	Family Medicine Departments
WHO	World Health Organization
Hgb	Hemoglobin
BMI	Body Mass Index

ACKNOWLEDGEMENTS:

First and foremost, praises and thanks to the Allah, the Almighty, for His showers of blessings throughout our research work to complete the research successfully. Then we would like to express special thanks to King Fahd Armed Forces Hospital and Research Center for their professional and logistical support. Finally, we want to express our sincere gratitude to all the participants in this research and special thanks to everyone who helped and contributed to our success directly or indirectly.

DECLARATIONS:

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Review Board (IRB) Committee King Fahd Armed Forces Hospital

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