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ANEMIA PREVALENCE AMONG PREGNANT WOMEN AT ANTENATAL CLINICS OF MUZAFFARABAD: A COMPREHENSIVE ASSESSMENT

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Abstract

There are about 41.8% of the pregnant women are anemic in the world. It is an important public health issue among pregnant women especially in the developing countries such as Pakistan. The main objective of the present study was, therefore, to determine the frequency of anemia in pregnant women (aged between 15-47 years) who were attending for their antenatal visits at the Shaikh Khalifa bin Zaid Al-Nehyan Combined Military Hospital (SKBZ) of Muzaffarabad, Azad Jammu and Kashmir, Pakistan. A descriptive cross-sectional study was carried out from May to December 2023, on 100 pregnant women who were attending for their antenatal visits at the Combined Military Hospital of Muzaffarabad. Systematic random sampling technique was used to select the study subjects. Information about socio-economic and demographic characteristics, clinical or obstetric characteristics, consumption of the iron and iron containing sources of food were collected by using pretested, validated, structured and self-administered questionnaire and a checklist. Descriptive analysis by using means, standard deviation, range, frequency and percentages was computed. The Chi-square test (P-value<0.05) and odds ratio (OR) with 95% of the confidence interval (CI) was used to find the relationship between dependent and independent variables. The findings from this study revealed that the overall prevalence of anemia among in pregnant women was 42.0%. Of these, 16.7% of the participants were severely anemic, 45.2% of them were moderately anemic and the remaining 45.2% were mildly anemic. Reproductive health education and advice should be given to all the women to create awareness regarding risk factors that develop anemia in late pregnancy.

INTRODUCTION

Anemia is defined as a condition in which either the amount of red blood cells (RBCs) reduces or the capacity of these cells to carry oxygen decreases to meet the normal physiologic functions of the body. Anemia in pregnancy usually refers to the hemoglobin level of <11 g/dl in the venous blood. It affects over 56 million women in the world including two-thirds from Asia. (Nurdin, Veni, Ansariadi & Andi, 2018).

Anemia is one of the most important public health issues in the world especially for the women of reproductive age in the developing countries. There are about 2 billion people (56 million pregnant women) estimated to be anemic throughout the world. About 56.0% of the pregnant women and 43.0% of the non-pregnant women in the developing countries are anemic while the corresponding percentage of the anemic women in the developed countries is only 18.0% (Alemayehu, Gedefaw, Yemane & Asres, 2016). The prevalence of anemia among pregnant women in the developing countries ranges from 33.0 to 75.0%. The prevalence of anemia among pregnant women is about 41.8% worldwide varying from a high of 45.0% in Pakistan to a low of 5.7% in the United States of America. Some women become progressively anemic, and others are anemic before the index pregnancy (Abdulkadir, Oya, Elif & Mehmet, 2010).

Usually, women become anemic in pregnancy due to increased demand for the iron and other substances because of increased physiological pressure of the pregnancy. The inability of the women to take the required level of iron and other vitamins either due to infections or dietary deficiencies develops anemia. According to World Health Organization (WHO), anemia ranges from mild (hemoglobin level 10.0-10.9 g/dl) moderate (hemoglobin level 7-9.9 g/dl) to severe (hemoglobin level < 7 g/dl) at pregnancy (Haider, Olofin, Wang, Spiegelman, Ezzati & Fawzi, 2013).

CAUSES OF ANEMIA

Anemia is a significant maternal problem during pregnancy, associated with a negative outcome for both the woman and the new-born. The most prevalent types of anemia in pregnancy include Iron deficiency anemia, Folate deficiency anemia, malarial infection, Worm infestation and the Vitamin B12 deficiency anemia. Anemia among pregnant women is often caused by the genetic, iron deficiency, worm infestations and parasite infections. About 44 million of the pregnant women are mainly infected with the worms all around the world. Malaria infections, worms and schistosomiasis contribute to nearly 25.0% of the anemia among pregnant women in the Asia. A study conducted in Pakistan reported that several factors contribute to anemia including genetic, nutritional, frequent labor, increased number of children, infectious diseases, worm infestations and abortions. However, iron deficiency was found to be the main cause of anemia (75.0%). The main causes of iron deficiency involve insufficient consumption of iron and folic acid rich food items and non-adherence to oral iron therapy in pregnancy (McClure, Meshnick, Mungai, Malhotra, King, Goldenberg & Dent, 2014).

EFFECTS OF ANEMIA

Anemia is the major risk factor among pregnant women, and it is associated with an increased morbidity and mortality of both mother and child. Anemia in pregnancy is also associated with an increased peri-natal mortality, low APGAR score, low birth weight, wastage of fetus and still birth. Overall, more than half million women and about 85.0% in the developing countries die each year from causes related to the pregnancy. The poor blood circulation in pregnancy has a greater impact on the placenta. The fetus ability to grow in the uterus is supposed to be the placental function which is responsible for the exchange of nutrients and respiratory gases. Anemia among pregnant women decreases tolerance to the loss of blood and causes impaired cardiac function and failure (Kalaivani, 2009).

PROBLEM STATEMENT

Anemia is the more common among pregnant women in Pakistan and it is associated with an increased maternal and child morbidity and mortality. The complications of anemia among pregnant women include preterm labors, poor weight gain, pregnancy related hypertension, accidental hemorrhage, placenta previa, premature membrane rupture, eclampsia, and high

susceptibility to the urinary tract infections. (Abbasi, Ansari, Devrajani & Abbas, 2009).

There is a lack of authentic research data regarding magnitude and severity of anemia in Muzaffarabad Azad Kashmir. Hence, the main purpose of the study is to determine the frequency of anemia in pregnant women attending for their antenatal visits at Combined Military Hospital/Sheikh Khalifa Bin Zaid Al-Nehyan (CMH/SKBZ) Muzaffarabad

SIGNIFICANCE OF THE STUDY

The reason behind this study is to determine the magnitude and severity of anemia among pregnant women. It will also serve as a reference study for future research. The study will also be helpful to the Ministry of Health (MOH) to know more about the extent and severity of the disease so that prevention and control measures can be implemented.

MATERIALS AND METHODS

STUDY DESIGN

A hospital-based observational descriptive cross-sectional study was conducted from May to December 2023. The study was conducted at Combined Military Hospital/Sheikh Khalifa Bin Zaid Al-Nehyan (CMH/SKBZ) of the District Muzaffarabad. Participants of the study included all the pregnant women (aged between 15-49 years) who were attending the antenatal health care unit at CMH/SKBZ Muzaffarabad during the data collection period of this study. The systematic random sampling method was used to select samples in this study. The estimated 420 pregnant women during period of 6 months were divided by the sample size (100) to give the sampling interval (k) of the 4. However, the first participant was selected randomly from the first four visitors in each day. A special request was made to the staff to direct every 4th individual who came from the hospital laboratory with results of hemoglobin (Hb). The procedure was repeated until the desired sample size was obtained.

A pre-tested, validated, self-administered and structured questionnaire was used for data collection. The questionnaire consisted of the following sections: Socio-economic and demographic characteristics, clinical/Obstetric characteristics and laboratory examinations results.

INCLUSION CRITERIA

- Pregnant women (aged between 15-49 years) who were attending for their antenatal visits at CMH/SKBZ Muzaffarabad.
- Pregnant women who were agreed participate in this study.

EXCLUSION CRITERIA

- Those pregnant women were who were absent in antenatal booklet/register of Hospital during the study period.
- Pregnant women who were not agreed to participate in this study.

RESULTS

SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS

The mean age of the participants was 28 ± 5.8 years. Most of the participants 47 (47.0%) were distributed among age category of 25–34 years. About 23 (23.0%) and 24 (24.0%) were in the age category of 15-24 years and 35-44 years respectively. The remaining 6 (6.0%) were aged 44 and more (Table 4.1).

Table 4.1: Age of the Participants

Age	Frequency (N)	Percentage (%)
15-24 years	23	23.0
25-34 years	47	47.0
35-44 years	24	24.0
> 44 years	6	6.0
Total	100	100.0

Employment Status

Of all the 100 participants, only 33 (33.0%) of the participants were gainfully employed and 67 (67.0%) were non-employed in this study (Table 4.3).

Table 4.2: Employment Status of the Participants

Employment status	Frequency(N)	Percentage (%)
Gainfully employed	33	33.0
Not employed	67	67.0
Total	100	100.0

Monthly Household Income

Most of the participants 33 (33.0%) had monthly household income of < 30,000 Rupees, 26 (26.0%) and 22 (22.0%) had family income of 30,000-60,000 and 61,000-90,000 Rupees per month. Only 19 (19.0%) of the participants had a monthly household income of > 90,000 Rupees (Table 4.2).

Table 4.3: Monthly Household Income of The Participants

Family income	Frequency(N)	Percentage (%)
< 30,000 Rupees	33	33.0
30,000-60,000 Rupees	26	26.0
61,000-90,000 Rupees	22	22.0
> 90,000 Rupees	19	19.0
Total	100	100.0

Number of Antenatal Visits

Table 4.4 indicates the frequency of antenatal visits of study participants at CMH/SKBZ Muzaffarabad. Majority of the study participants have three visits (56.0%), 17 % visited two times and the remaining 27 (27.0%) attended antenatal clinic for four or more times during the period of their pregnancy.

Table 4.4: Number of Antenatal Visits

ANC visits	Frequency (N)	Percentage (%)
Two	17	17.0
Three	56	56.0
Four or more	27	27.0
Total	100	100.0

Parity

Table 4.5 shows that about 21 (21.0%) of the participants were nulliparas (zero children), 33 (33.0%) of the participants were primipara (gave birth to one child), 18 (18.0%) were multipara (gave birth to 2-4 children) while the remaining 28 (28.0%) were grand multipara (gave birth to 5 or more children).

Table 4.5: Number Of Children at The Time of Study

Parity	Frequency (N)	Percentage (%)
Nullipara	21	21.0
Primipara	33	33.0
Multipara	18	18.0
Grand multipara	28	28.0
Total	100	100.0

Gestational Age

Table 4.6 explains the gestational age of the participants at the time of study. Most of the participants 59 (59.0%) were in their third trimester, 26 (26.0%) of them were in second trimester and only 15 (15.0%) were in first trimester.

Table 4.6: Gestational Age at The Time Of Study

Gestational age	Frequency (N)	Percentage (%)
First trimester	15	15.0
Second trimester	26	26.0
Third trimester	59	59.0
Total	100	100.0

Child Spacing

Table 4.7 shows that majority of the participants 55 (55.6%) in this study had birth intervals of more than two years between the last and current delivery, while 44 (44.4%) of the participants had birth spacing of less than two years.

Table 4.7: Birth Spacing Between Current and Last Pregnancy

Child spacing	Frequency(N)	Percentage (%)
< 2 years	44	44.4
> 2 years	56	55.6
Total	100	100.0

PREVALENCE OF ANEMIA

Table 4.8 presents frequency and percentage distribution of the hemoglobin level among the study subjects. The total prevalence of anemia was 42 (42.0%). Most of the participants (58.0%) had hemoglobin level of ≥ 11 g/dl and the remaining 42.0% had hemoglobin level of < 11 g/dl. In terms of severity of the anemia, 38.1% of the participants were mild anemic, 45.2% were moderate anemic and 16.7% were severe anemic.

Table 4.8: Prevalence Of Anemia Among Study Subjects

Hemoglobin level (g/dl)	Frequency (N)	Percentage (%)
Anemia (< 11 g/dl)	42	42.0
i. Mild-Anemia (10-10.9 g/dl)	16	38.1
ii. Moderate-Anemia (7-9.9 g/dl)	19	45.2
iii. Severe-Anemia (≤ 7 g/dl)	7	16.7
Non-Anemia (≥ 11 g/dl)	58	58.0
Total	100	100.0

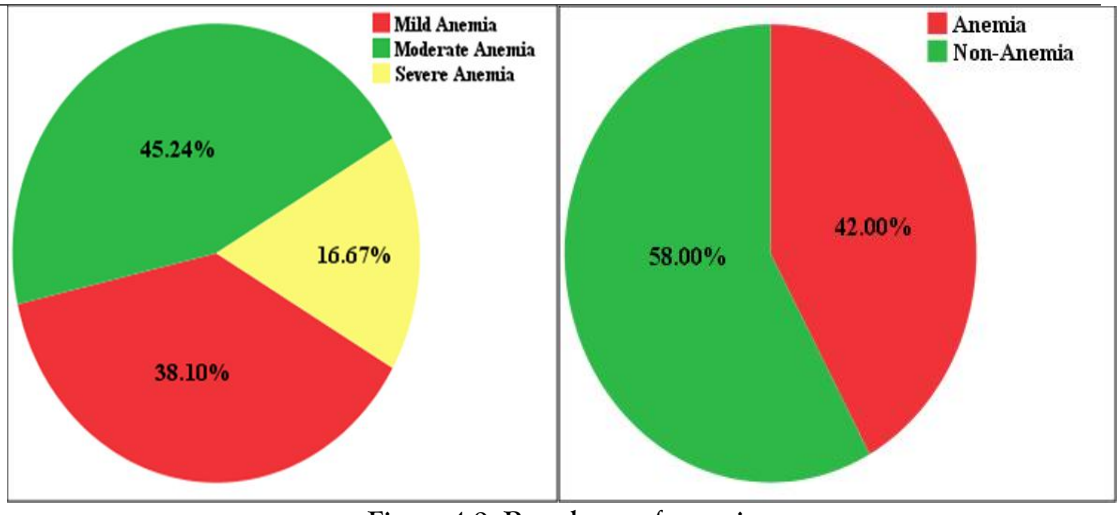

Figure 4.9: Prevalence of anemia

CONSUMPTION OF FOLIC ACID AND IRON SOURCES OF FOOD

Table 4.10 shows the consumption of iron supplements. 87.0% of those participants who had taken iron supplements were 87.0% and 13.0% reported that they had not taken iron supplements.

Table 4.10: Iron Supplements Intake

Supplement taking	Frequency	Percent
Yes	87	87.0
No	13	13.0
Total	100	100.0

The frequency and percentage of the folic acid and iron sources of food consumption in a week is presented in table 4.11. Most of the participants, 45.0% and 41.0% consumed vegetables and chicken one or two days per week respectively. About 44.0% and 33.0% of the participants had taken citrus fruits and goat meat/beef five or more days a week respectively. However, 12.0% and 11.0% of the participants never consumed dark green leafy vegetables and fish in a week respectively.

Table 4.11: Frequency Of Folic Acid and Iron Source Foods Consumption

Food items	Never		1-2 days		3-4 days		5 or more days	
	N	%	N	%	N	%	N	%
Green leafy vegetables	12	12.0	32	32.0	26	26.0	30	30.0
Liver	7	7.0	34	34.0	28	28.0	31	31.0
Cabbage	9	9.0	41	41.0	44	44.0	6	6.0
Beef	5	5.0	33	33.0	29	29.0	33	33.0
Chicken	3	3.0	41	41.0	32	32.0	24	24.0
Fish	11	11.0	29	29.0	27	27.0	33	33.0
Bean and legumes	2	2.0	42	42.0	36	36.0	20	20.0
Citrus fruits	9	9.0	21	21.0	26	26.0	44	44.0
Vegetables	0	0.0	45	45.0	42	42.0	13	13.0
Whole grain cereals	3	3.0	31	31.0	39	39.0	27	27.0

FACTORS ASSOCIATED WITH ANEMIA

Table 4.12 displays a bivariate analysis of the factors associated with anemia among the study participants. Age, educational level, antenatal visits at CMH/SKBZ, taking of iron supplementation, gestational age and child spacing were found significantly associated with anemia among participants in their pregnancy. About 66.7%, 58.3%, 40.4% and 21.7% of the participants who were in age groups of more than 44, 35-44, 25-34 and 15-24 years were reported anemic, respectively. There was found a significant difference between age of the participants and their anemia status (X^2=8.051, P-value=0.04). The employment status of the participants was also found significantly associated with anemia (X^2=11.470, P-value=0.001). Anemia was more prevalent among those participants who were not employed at 57.7% as compared to participants who were gainfully employed at 18.2%. Most of the participants (63.3%) who were anemic attended CMH/SKBZ for antenatal visits in their second trimester, 62.5% of the anemic participants were in the first trimester and 24.1% were in the third trimester of their gestational time. There was a significant difference in gestational period of the participants at their first visit at CMH/SKBZ and anemia (X^2=15.488, P-value=0.0011). Participants who had child spacing less than two years showed a higher percentage of anemia at 55.4% than those participants with a birth interval of equal to or greater than two years at 25.0% (X^2=9.321, P-value=0.02). On the other hand, the percentage of anemia was high among participants who had a current disease during their pregnancy at 63.6%, and in participants who were not taking iron supplements at 76.9% (Table 4.13).

Table 4.12: Bivariate Analysis on Socio-Demographic Factors Associated with Anemia

Factors	Anemia		Non-Anemia		X^2	Df	P-value
	N	%	N	%			
Age							
15-24 years	5	21.7	18	78.3	8.051	3	0.04*
25-34 years	19	40.4	28	59.6			
35-44 years	14	58.3	10	41.7			
> 44 years	4	66.7	2	33.3			
Education level							
Primary	13	43.3	17	56.7	0.910	3	0.823
Secondary	18	40.9	26	59.1			
Tertiary	4	57.1	3	42.9			
No formal education	7	36.8	12	63.2			
Employment status							
Gainfully employed	6	18.2	27	81.8	11.470	1	0.001*
Non-employed	36	53.7	31	46.3			
Family income							
< 30,000 Rupees	14	42.4	19	57.6	2.644	3	0.450
30,000-60,000	14	53.8	12	46.2			
Rupees	7	31.8	15	68.2			
61,000-90,000	7	38.8	12	63.2			
Rupees							
> 90,000 Rupees							

*Statistically significant

Table 4.13: Bivariate Analysis of Clinical Characteristics Associated with Anemia

Factors	Anemia		Non-Anemia		X^2	Df	P-value
	N	%	N	%			
Antenatal visits							
Two	10	58.8	7	41.2	8.974	2	0.01*
Three	27	48.2	29	51.8			
Four or more	5	18.5	22	81.5			
Parity							
Nullipara	9	42.9	12	57.1	2.239	3	0.524
Primipara	14	42.4	19	57.6			
Multipara	5	27.8	13	72.2			
Grand multipara	14	50.0	14	50.0			
Gestational age							
First trimester	10	62.5	6	37.5	15.488	2	0.000*
Second trimester	19	63.3	11	36.7			
Third trimester	13	24.1	41	75.9			
Child spacing							
< 2 years	31	55.4	25	44.6	9.321	1	0.02*
> 2 years	11	25.0	33	75.0			
Current disease							
Yes	7	63.6	4	36.4			
No	35	39.3	54	60.7	2.375	1	0.123

Supplement taking	32	36.8	55	63.2	7.481	1	0.006*
Yes	10	76.9	3	23.1			
No							

DISCUSSION

Globally, the prevalence of anemia among pregnant women ranges from 41.8% to 43.8% (Chrispinus, 2014). The prevalence of anemia among pregnant women in the developing countries is reported as 60.0% (Agan, Ekabua, Udoh, Ekanem, Efiok & Mgbekem, 2010). The prevalence of anemia among South Asian countries ranges from 42.0% to 55.0% (Sajid, Gul, Kamran, Shabina, Atif, Sumra, Imtiaz, Muhammad, Zamir, Arjumand & Zulfiqar, 2017). In Pakistan, about 45.0% of the pregnant women are anemic (Abdulkadir et al., 2014).

In this study, the prevalence of anemia in pregnant women reporting for their antenatal visits in CMH/SKBZ Muzaffarabad was 42.0%. The finding from this study was significantly low as compared to other local studies conducted in different areas of Azad Jammu and Kashmir and Pakistan. In a study carried out in Azad Jammu and Kashmir, about 91.0% of the pregnant women were anemic in Muzaffarabad (Rehman et., al 2025). In Punjab Pakistan (Huma, Anam, Sajid, Shazia, Muqeeza & Rabia, 2018) 65.4% and in Mardan, Pakistan (Sulaiman, Zarmina & Abdul, 2018) 76.7% of the prevalence was reported in pregnant women who were attending antenatal health care units.

The variations in the prevalence of anemia among pregnant women in this study and others may be attributed to the population differences, various causes of anemia, dietary habits, sample size, study design and difference in methodology used to determine hemoglobin levels. From the findings of this study, it is evident that anemia is an important public health issue in Muzaffarabad (Rehman et., al 2025).

About 38.1% of the anemic participants had mild anemia, 45.2% of them had moderate anemia and 16.7% of the participants had severe anemia in this study (Table 4.11). Other studies conducted in India which reported that about 12.0% of the participants had mild anemia, 14.0% had moderate anemia and 6.0% had severe anemia. This study and other studies showed that the moderate anemia contributes a significant percentage of the anemia among pregnant women who were attending antenatal clinics. Moderate anemia in pregnancy causes significant health consequences including energy loss and poor function. Daily life activities such as household management and childcare as well as the performance of the jobs are usually affected. These women are more prone to the infections and usually the infections improvement is prolonged. Hence, health education and dietary advice to prevent the severity and prevalence of anemia in pregnancy should be a top priority for the women attending for their antenatal visits (Kumar, Asha, Murthy, Sujatha & Manjunath, 2013).

The prevalence of anemia was observed to increase as the age of the participants increases in this study. Participants who were in the age group of 36-44 (58.3%) and > 44 (66.7%) were reported to be significantly anemic as compared to the participants who were in age group of 15-24 (21.7%) and 25-34 (40.4%) years (Table 4.14). The finding was in comparison with previous studies conducted in China (Qiuyue, Shikun, Jue, Qiaomei, Haiping, Yiping & Min, 2017) and Iran (Fatemeh, Nahid, Sedigheh & Jamileh, 2010) reporting a significant association between age of the participants and their anemic status. This may be attributed to the fact that younger age participants usually have a better immunity and the ability for the production of blood cell. Older age participants are usually multigravida. Multigravida can develop anemia by reducing iron reserves during every pregnancy and causing loss of blood during each delivery (Rajamouli et al., 2016).

The percentage of anemia was significantly higher among participants who were not employed (53.7%) than participants who were gainfully employed (18.2%) (Table 4.14). The finding agreed with other studies conducted in Pakistan (Baig-Ansari et al., 2014) and Nigeria (Okunadeand & Adegbesan, 2014). It is generally believed that employed participants have adequate resources such as clean water, good housing, proper sanitation, balanced diet and access to quality health services. Also, these participants are more conscious to attend antenatal health care clinics more frequently than non-

employed participants. This can largely contribute to the health and well-being of the women as well as positive outcome of the pregnancy.

The findings from the study revealed that the likelihood of anemia was relatively lower among participants who had four or more antenatal visits compared to the participants who had two or less antenatal visits during their pregnancy. There was found a statistically significant association between the number of antenatal visits at CMH/SKBZ and the anemia (Table 4.15). The finding was consistent with a study conducted in Thailand (Chotnopparatpattara, Limpongsanurak & Charnngam, 2007) which also found a significant association between antenatal visits and anemia. The reason behind is that regular check-up of the blood hemoglobin level might have created awareness among participants to prevent anemia through healthy eating. They also receive medications such as anti-helminthes and iron supplementations.

In this study, most of the participants (62.5%) attended CMH/SKBZ for their antenatal visits during the 1st trimester of their pregnancy. However, about 24.1% of the participants visit during their 3rd trimester of pregnancy (Table 4.15). Attending hospital for antenatal care early in the first trimester reduced the chances of anemia among pregnant women. Participants who visited CMH/SKBZ for antenatal care during the first trimester of their pregnancy were more likely to be anemic as compared to those participants who visited at CMH/SKBZ for antenatal in the third trimester. The finding was similar to a study conducted in Pakistan (Riaz, Ayaz, Khader, Abdelslam & Anwar, 2013) which reported an association between gestational age of the participants and anemia, but it was contradictory to the study from Sudan (Adam, Khamis & Elbashir, 2009) which reported no significant association between gestational age and anemia.

In this study, it was found that the prevalence of anemia was considerably higher in the grand multipara and the second trimester of the pregnancy (Table 4.15). The finding was consistent with other studies conducted in Pakistan (Zehra, Khan & Qadri, 2017 and Ghana (Kwabena, Stella, Dorothy & Yeboah, 2018). However, no statistically significant relationship was found between anemia and the parity (P-value=0.524).

CONCLUSION

The findings from this study revealed that the total prevalence of anemia among pregnant women reporting for their antenatal visits in CMH/SKBZ Muzaffarabad was 42.0% and anemia is a significant public health issue. The findings also revealed that the age of the participants, education level, gestational age at their antenatal visits, current disease, and consumption of the iron supplements, employment status, and number of antenatal visits at CMH/SKBZ were significantly associated with the anemia status of the participants.

This study found that only 27.0% of the participants had antenatal care visits four times or more (Table 4.) and 13.0% had not taken iron supplements (Table 4.11).

RECOMMENDATIONS

The findings shown that anemia is still prevalent among pregnant women attending for their antenatal visits at CMH/SKBZ Muzaffarabad. Based on the findings of the study, the following recommendations were made.

1. The Health Department of Azad Jammu and Kashmir should implement health education programs and policies on balanced diet and compliance with the folic acid and iron supplements.
2. Pregnant women should be directly monitored to take the folic acid and iron supplements at the antenatal health care unit.
3. The Director Health CDC of Azad Jammu and Kashmir should ensure constant supply of the antimalarial and bed nets. The staff should ensure that the medicine is taken under strict observation at the antenatal care unit at CMH/SKBZ.
4. A continuous reproductive health education and advice should be given to all the women in particular reproductive age females to create awareness among women regarding risk factors that usually develop anemia in pregnancy.

There is an urgent need for the measures such as outreach health education programs on the importance of earlier booking of antenatal, mass media campaigns and compliance with the use of prescribed drugs.

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