



Incidence of Anemia Among Pregnant Females of Rural Areas of Punjab

MUHAMMAD SAQIB¹, FARKHANDA MANZOOR², RIDA SHAHID², SHAGUFTA NAZ², SAIMA SHARIF^{2*}

¹Tehsil Headquarter Sharqpur, Sheikhpura; ²Department of Zoology, Lahore College for Women University, Lahore, Pakistan.

Abstract | Background: Anemia is a clinical condition characterized by decrease in hemoglobin concentration of blood and according to World Health Organization (WHO) anemia is the major public health problem, so it is important to find the prevalence of anemia in pregnant females. The aim of this study is to determine the prevalence of anemia in pregnant females of rural areas of Punjab. **Methodology and materials:** This cross sectional study was conducted from January 2016 to June 2016. The locations of the subjects (n=600) were asked verbally. Blood sample of subjects (n=600) were collected and run on hematological analyzer (Model 'KX-21 Sysmex', Germany) to assess various parameters of blood. Statistical analysis was done using SPSS (version 13). The patients with low hemoglobin level (≥ 10.9 g/dl) were considered as anemic. **Result:** The mean hemoglobin level in anemic subjects was 8.8 ± 0.04 (g/dl) and the total prevalence was 89%. The mean value of red blood cell (RBC's), white blood cell (WBC's) platelets and hematocrits in anemic subjects were 4.1 ± 0.02 ($10^6/\mu\text{l}$), 10 ± 0.06 ($10^3/\mu\text{l}$), 350 ± 3.35 ($10^3/\mu$) and 33.6 ± 0.28 (%) respectively. The subjects were also divided into three trimesters to determine the prevalence of anemia in different trimesters. The mean values of hemoglobin level in three trimesters were 9.2 ± 0.07 (g/dl), 9.1 ± 0.08 (g/dl) and 7.8 ± 0.07 (g/dl) respectively. **Conclusion:** The prevalence of anemia among pregnant female of rural area was 89% and it was observed that in the 3rd trimester hemoglobin level was low as compared to the 1st and 2nd trimester.

Keywords: Anemia, Hemoglobin, Platelets, Urban areas, Rural areas, Pakistan

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***Correspondence |** Saima Sharif, Department of Zoology, Lahore College for Women University, Lahore, Pakistan; **Email:** ssharif1978@yahoo.com

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INTRODUCTION

Anemia is defined as a clinical condition characterized by decrease in hemoglobin concentration of blood below the normal for the age, sex, physiological condition and altitude above the sea level of that person (Idris Rehman, 2005). According to World Health Organization (WHO) anemia is the major public health problem and it is higher in developing countries. When hemoglobin concentration is less than 7.0 g/dl anemia is considered severe, when hemoglobin falls between 7.0 and 9.9g/dl it is considered moderate and when hemoglobin is from 10.0 to 10.9 g/dl (WHO, 2011) it is considered as mild.

In developing countries anemia in pregnancy is a common disease where poverty, ignorance and disease are still prev-

alent among the people. Worldwide, it is estimated that 58.27 million women were anemic during pregnancy, of whom 55.75 million (95.7%) live in developing countries (Broek and Letky, 2000). It was estimated that up to 60% of pregnant women in developing countries may be anemic, and nearly 7% of pregnant women were severely anemic (Akinyinka, 2004; WHO, 1992).

There are many effects of anemia on pregnancy; it has a significant effect on the health of the mother and fetus. Due to anemia in pregnancy fetuses are at risk of preterm deliveries, low birth weights, morbidity and perinatal mortality due to the impairment of oxygen delivery to placenta and fetus (Brabin et al., 2001; De Mayer, 1989; Harrison, 1975). The World Health Organization reports anemia among the top ten most important contributors to global

ill health and deaths.

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Anemia was significantly associated with maternal deaths in developing countries because it is responsible for 20-30% of all the maternal mortality (Broek and Letky, 2000; WHO, 1992; Hoque et al., 2009). The mean minimum acceptable hemoglobin level during pregnancy by WHO criteria is taken to be 11g/dL (PCV of 33%) in the first half of pregnancy and 10.5 g/dL in the second half of pregnancy (WHO, 1992).

In Pakistan, 26% married women of urban areas with an age ranges from 15 to 44 are reported to be anemic and 47% married women of rural areas with the same age range reported anemic (Pakistan Medical Research Council, 1998). The objective of this study was to evaluate the prevalence of anemia in pregnant female living in rural areas of Punjab.

MATERIALS AND METHODS

The study is cross-sectional study and was conducted among women of Services hospital, Lahore and THQ Sharqpur from January 2016 to June 2016. A total of 600 subjects were included in this study. The sample size was calculated with the help of sample calculator on Raosoft with 95% confidence level, 3.86 % of margin of error and taking expected percentage of anemia as 40% in subjects. Services Hospital is a tertiary care hospital and patients from the periphery regions visit this hospital. So we had selected those patients which were from the periphery region and their area of residence was asked verbally. THQ Sharqpur hospital is in the periphery of Lahore and people of rural area visit this hospital. Procedures followed were in accordance with the ethical committee. To find the prevalence of anemia in pregnant females the hemoglobin level of all the females in study population was analyzed. Then further information such as age, height, weight, income of husband, number of children and trimester of participant were collected through the questionnaire. All the pregnant females who were healthy were included in this study. Females which were not pregnant or females with other disorders or diseases were excluded.

Blood samples were instantly collected in EDTA tubes and the samples were immediately run on hematological analyzer (Model 'KX-21 Sysmex', Germany) to assess different parameters including white blood cell count, red blood cell count, hemoglobin concentration and hematocrits.

The data of all the subjects was entered on MS excel work sheet. Furthermore the tables showing the results were also made on MS excel work sheet. The statistical analysis was then conducted on the data using statistical software pack-

RESULTS

The mean age of the subjects (n=600) was 24 ±0.19 years. Following the criteria of WHO (World Health Organization) (WHO, 2011) it was observed that 65 female (10.8%) were normal whereas 535 females (89%) were anemic. On the basis of their hemoglobin level the subjects were categorized into three categories which were mild anemic (n=63), moderate anemic (n=471) and severe anemic (n=1). To observe the impact of trimesters on hemoglobin level the subjects were further classified on the basis of their trimesters such as 1st trimester (n=289), 2nd trimester (n=272) and third trimester (n=37). It was found that the mean value of hemoglobin in 1st trimester was 9.2±0.07 (g/dl), in 2nd trimester it was 9.1±0.08 (g/dl) and in 3rd trimester the value was 7.8±0.07 (g/dl).

Table 1 refers to assessment of hematological parameters in different categories of anemic subjects.

Table 1: Hematological Parameters in Different Categories of Anemic Subjects

Sr. no.	Variable	Mild	Moderate	Severe	Value of F
1.	Hemoglobin (g/dl)	10.4±0.04	8.6±0.04	6.9±0.04	152.46**
2.	RBC's (10 ⁶ /μL)	4.3±0.02	4.1±0.02	3.9±0.02	1.24 ^{ns}
3.	WBC's (10 ³ /μL)	10.2±0.06	10.1±0.06	12.2±0.06	.914 ^{ns}
4.	Platelets (10 ³ /μL)	319.7±3.3	354.5±3.3	357±3.3	5.69*
5.	Hematocrits (%)	34.2±0.2	33.6±0.2	26±0.2	.903 ^{ns}

*Significant p ≤ 0.05 ; **Highly significant p ≤ 0.01; ^(ns)Non-significant p ≥ 0.05

DISCUSSION

The present study was conducted to assess the prevalence of anemia among pregnant females of rural area. This study showed that the anemia was significantly high in pregnant females of rural area. The total anemic patients were about 89% as compared to the non-anemic which were only about 10.8%. It was concluded that the moderately anemic patients were more than the other categories of anemic patients. One possible explanation for the high rate of moderately anemic patients could be that the hemoglobin measurements were obtained in the first and second trimester, when the hemoglobin concentration is expected to be at its lowest because plasma volume is expanding more rapidly than the red cell mass. It has been estimated that

nutritional anemia affects almost two-thirds of pregnant women in developing countries. However, many of these women were already anemic at the time of conception, with an estimated prevalence of anemia of almost 50% among non pregnant women in developing countries (WHO, 1992). In Pakistan, the prevalence of anemia among ever-married women aged 15 to 44 is reported to be 26% in urban areas and 47% in rural areas (Pakistan Medical Research Council, 1998).

It was also observed that anemia was more common among the females who registered for antenatal in the third trimester. This finding compared favorably with several studies done before (Broek and Letky, 2000; Soares et al., 2010; Iyengar and Apte, 1970). The study showed that the hemoglobin level was 7.8 ± 0.07 in 3rd trimester which is low as compared to the 9.2 ± 0.07 in 1st trimester and 9.1 ± 0.08 in 2nd trimester.

The prevalence of anemia among pregnant women in other developing countries ranges from 35% to 81% (Shali et al., 2004; Adam et al., 2005; Ayoya et al., 2006). However, the prevalence of severe anemia was lower in our study 0.1 % than the reported for developing countries (WHO, 1992). Nearly half of the women had borderline anemia, with hemoglobin concentrations more than 10 g/dl but less than 11 g/dl.

Women are considered more susceptible to anemia the world over. However its prevalence in Pakistani women is far more widespread. Previously it was found that overall; more than one fifth of women in Pakistan suffered from anemia (Mother Child Health in Pakistan, 2005). However, with ever increasing population being pushed below the poverty line, the problem may have greatly exacerbated. It should therefore be a priority research area in Pakistan. We chose this segment of females for focus with a view to reassess the extent of the problem in child bearing age females. A significantly higher prevalence of anemia was found among pregnant women of rural areas. Pregnant women from rural areas were more than three times more likely to be anemic than their urban counterparts. Association of rural residence with anemia has also been reported earlier. The higher prevalence of anemia among pregnant women from rural areas is likely related to lack of information about adequate nutrition during pregnancy, economic factors and inaccessibility of health care centers.

Study conducted in 1987 had placed the prevalence of anemia in young women at 30% (Hamedani et al., 1987) while a recent study from Karachi indicates its increased prevalence to 43.36% (Ansari et al., 2009). Our study is similar to this study but due to large subject size our study is more authentic and we also notice increase in prevalence

of anemia to about 89%. WHO estimates that anemia affects nearly half of all pregnant women in the world 52% in developing countries compared with 23% in the developed world (WHO, 2008).

The females pregnant for the first time are at greatest risk of developing anemia (Ahmad et al., 2010). Anemia occurs with such frequency during pregnancy that it is referred to as 'the most common medical complication of pregnancy. Our study has several limitations. First, the study was hospital based study and not population based study. Second the anemic subjects treated at hospital were included in this study. Finally we were unable to account for other known factors associated with anemia, such as helminth infection, genetic disorders, or other nutritional deficiencies such as folate, vitamin B12, and vitamin A deficiency.

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CONFLICT OF INTEREST

There is no conflict of interest.

AUTHORS CONTRIBUTION

Muhammad Saqib: Convinced the idea and helped in data collection. Farkhanda Manzoor: Reviewed the manuscript and helped in data analysis. Rida Shahid: Wrote the manuscript and helped in data collection. Shagufta Naz: Helped in statistical analysis. Saima Sharif: Convinced the idea, viewed the manuscript and helped in statistical analysis

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