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Prevalence of Iron Deficiency Anemia (IDA) in Pregnant Women and Its Associated Risk Factors: A Novel Study from Pakistan

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Anemia is a very common problem in obstetrics and perinatal care. Iron deficiency and related anemia during pregnancy are highly prevalent both in developed and underdeveloped countries and even within a country in different geographical regions with different etiologies such as standards of living. To find the differences in the prevalence and causes of IDA as well as contribution of different etiological factors in promoting IDA in pregnant women. A sample size of 280 was calculated and the study was carried to analyze the frequency of IDA at Khyber Teaching Hospital and the impact percentage of different etiological factors in development of IDA in pregnant women of age less than 40 years and without any comorbidities. Following causes were identified; low socioeconomic state, food quality, education level, number of previous pregnancies and stage (trimester) of pregnancy. Out of 280 pregnant women 185 were found normal Hb levels, 84 having mild anemia, 11 were found to have mild anemia. 95 women had microcytic anemia. Additionally, 173 out of total anemia pts were found to have monthly income of less than 20,000 being the most predictable factor. Third trimester was mostly credited for IDA in pregnancy. Similarly triplet, followed by twin and then singleton pregnancy was responsible for IDA. Anemia has serious longterm effects on the health of mother as well as fetus besides obstetrics complications.

Keywords: Anemia; Risk Factors; Pregnant Women

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INTRODUCTION

Anemia is very common in underdeveloped countries reaching a state of epidemic; however, severity and occurrence vary by age, sex, altitude, smoking and pregnancy status (1). The most common cause of anemia globally is thought to be iron deficiency. Hallmark of anemia is fatigue, weakness, and dizziness. Pregnant women and children are particularly vulnerable.

Normal physiologic changes in pregnancy affect the hemoglobin (Hb), and there is a relative or absolute reduction in Hb concentration. The most common true anemia during pregnancy are iron deficiency anemia (approximately 75%) and folate deficiency megaloblastic anemia, which are more common in women who have inadequate diets and are not receiving prenatal iron and folate supplements. Anemia with hemoglobin levels less than 6 g/dl is associated with poor pregnancy outcome. Nevertheless, a mild to moderate iron deficiency does not appear to cause a significant effect on fetal hemoglobin concentration. An Hb level of 11 g/dl in the late first trimester and also of 10 g/dl in the second and third trimesters are suggested as lower limits for Hb concentration. In an iron-deficient state, iron supplementation must be given and follow-up is indicated to diagnose iron-unresponsive anemia [4]. Anemia, prematurity, spontaneous abortions, low birth weight, and fetal deaths are other complications of severe maternal anemia. Iron deficiency in pregnancy also appears to cause long-term and irreversible cognitive problems in the baby [5].

Socioeconomic status is measured as a combination of education, income and occupation and is a compatible predictor of development of IDA. Low income and illiteracy have been shown to be strong predictors of a range of physical and mental health problems because of inability to reach out to health facilities (6,7). During pregnancy, women need double the amount of iron than nonpregnant women need to make more blood to supply oxygen to your baby. Lack of this nutrient can result in development of iron deficiency anemia. Due to illiteracy and unawareness about family planning females have decreased spacing between child birth

which can lead to iron deficiency anemia. Individuals with lower socioeconomic status tend to receive prenatal care less frequently and are at high risk for developing obstetric complications due to iron deficiency anemia (8).

IDA is one of the world's leading cause of disability and thus one of the most serious global health issues. The prevalence of iron-deficiency anemia in pregnant women is estimated to be between 35 and 75% (average 56%) in developing countries, whereas in industrialized countries the average prevalence is 18% (9). Overall **prevalence** of iron deficiency in pregnant women in the United States is about 18%, with anemia in 5% of pregnant women and rates are increasing across trimesters from 6.9% to 14.3% to 28.4% (10). Globally anemia is diagnosed in 1.62 billion people among which 56 million are pregnant women which makes them the most affected group [11]. Prevalence of iron deficiency anemia among women in developing countries was calculated from 40% to 88% (64% average) [12]. World Health Organization has classified anemia prevalence (%) into **four Categories** of, severe ($\geq 40\%$), moderate (20-39.9%), mild (5-19.9%) and normal ($\leq 5\%$). Pakistan falls in the moderate category [13]. The aim of our study is to determine the prevalence and causes of iron deficiency anemia in pregnant women in antenatal clinics of Khyber Teaching Hospital because there is very limited data available regarding iron deficiency anemia in pregnancy because the social conditions pose serious challenges to women.

METHODS

A descriptive cross-sectional study involving pregnant women who presented to the Gynae and Obstetrics ward, was conducted, with patients age less than 40 years and without any comorbidities (Mean age= 34 years). Pregnant women with comorbid conditions or more than 40 years and not giving consent, admitted/visited in either gynecology/obstetrics ward/OPD's were excluded from the study.). Sample size was calculated by WHO formula equal to 280. The prevalence was 76% taken from study (8). The study

was carried out to analyze impacts of different factors on the development of IDA in pregnant women. It was completed in 4 months (December 2015 to March 2016). We started collecting data using a structured questionnaire (annexure) containing open and close ended questions. The data was collected with a face to face interview which was conducted by the researchers, informed written consent was taken. Pre-tested questionnaire was implemented. Sample technique was the simplest we can. Data is analyzed using SPSS (Statistical Package for the Social Sciences) version 23. Quantitative variables like age will be calculated as mean and $\pm$ SD. Qualitative variable like IDA, education, monthly income and food intake is presented in the form of percentages, tables, graphs and charts.

RESULTS

Our team conducted a cross-sectional study in OPDs of GYNAE department Khyber teaching hospital with total sample size of 280, data collected from pregnant women without co-morbid condition and age not more than 40 years. We determined the prevalence of Iron deficiency anemia which turned out to be 33.93% out of which 33.00% were mildly anemic and 3.93% were moderately anemic and 66.07% of respondent having no anemia. IDA were found to be most prevalent in those having low social economic state accounting 22.85% (<20000/monthly income), 7.85% (21000-35000/month income), 2.50% (36000-50000/month income) and 0.71% (>50000/month income).

The food quality also affected developing of anemia with more tendency to develop in those whose food quality was very week, showing women having good food quality available are only 5.71% anemic out of 23.9% and those having moderate, weak and very weak quality of food are 12.7%, 7.5%, 9.29% anemic out of 31.34%, 23.21%, 21.43% respectively.

The education level of respondent about pregnancy and taking care of their self also influenced the developing of anemia showing illiterate are more prone to develop IDA than others accounting the prevalence of IDA in illiterate 26.79%, those who have primary education 11.79% and those who are

educated up to middle or more 6.08% out of 47.86%, 23.93% and 28.22% respectively.

The number of children a women have previously also showed some influence on prevalence of IDA with women having more children previously are more prone to develop anemia than those who have less number accounting development of IDA 21.07%(up to 3 children), 11.78%(4-7 children), 1.07%(>7 children) out of 71.78%, 26.07% and 2.14% respectively.

Data also showed that women who are at their 3rd trimester of pregnancy are more to develop IDA than those in 1st and 2nd trimester of pregnancy accounting 31.07% (3rd trimester), 2.15% (2nd trimester), 0.71%(1st trimester) out of 85.35%, 11.9% and 2.85% respectively. Thus, the overall prevalence of IDA in pregnancy turned out to be 33.93% with socioeconomic status, food quality, month of gestation, previous number of children and education as their modifiers or influencers.

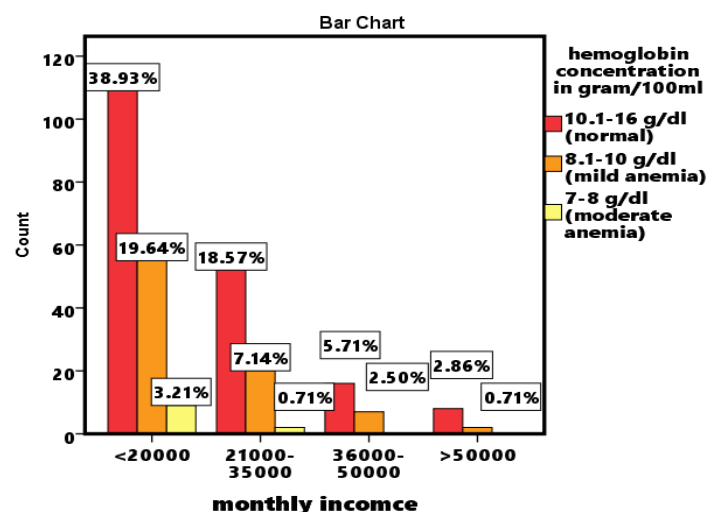


Figure 1 shows relation of socioeconomic state (income) with developing anemia. Figure shows the trend that those having low socioeconomic state are more prone to anemia than those having good socioeconomic status (income).

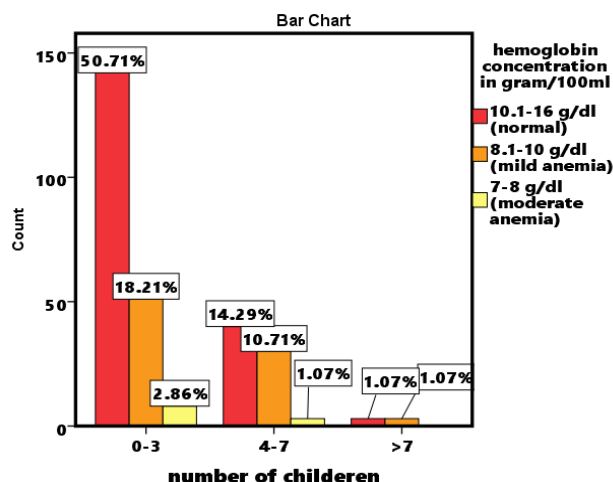


Figure 1.11 shows relation of hemoglobin concentration with number of children per woman. women who have up to 3 children are anemic 20.49% out of 71.26%, those having children number in between 4-7 are anemic 11.78% out of 26.07% and those have more than 7 children are anemic 1.07% out of 2.14%.

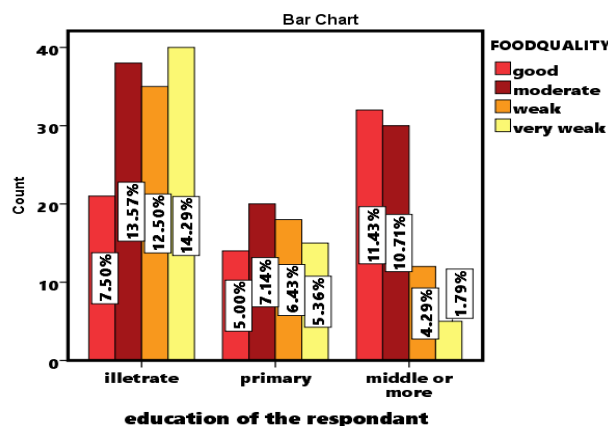


Figure 1.13 shows relation of education with maintaining food quality and developing

DISCUSSION

Though iron deficiency anemia prevails in child bearing women in developing world it is also common in developed world therefore special measures are taken to prevent iron deficiency anemia from developing because it has important adverse effect on maternal health such as delayed wound healing, needs of post-partum transfusion in women

with severe anemia and even decompensated heart failure in severe anemia. Also, on fetal development such as pre-term delivery, mental retardation, low birth weight for gestation and so many complications.

Prevalence of IDA anemia in pregnant women in our study is 33.39%, which in contrast to other cities of Khyber Pakhtun Khwa and Pakistan is quite satisfactory. Prevalence of IDA anemia in pregnant women in Mardan accounts for 76.6%, Karak 55.7%, Kohat 66.6%, Lahore 73%, and Karachi 64%.⁸ The significance difference between our study and reference study is due to low socioeconomic status of that study participant and low literacy ratio and low access to health care facilities. As people in Peshawar have relatively more access to health care facilities such as attending antenatal clinics early in their period of pregnancy which have decreased the prevalence of IDA.

In comparison, India has prevalence of iron deficiency anemia of 54% and in many African countries it exceeds 60% while in developed countries such as the USA, Turkey the prevalence is 17% and 28% respectively. This difference is probably attributed to good socioeconomic status, high education related to health care, good food quality and family planning (less children) while the worst condition in developing countries is due to low socioeconomic status, no access to health care facility or very little health care provision, low quality food, multiparity and in some ethnic group due to strict vegetarian diet. Previous studies also suggest that socioeconomic status, food quality, multiparity, and education are the key modifiers which define the risk of pregnant women for developing iron deficiency anemia.

Improving the socioeconomic status will improve the way of living, taking good quality food and taking care of pregnant women by providing them health care and education regarding pregnancy, all these factor will reduce the risk of developing IDA and will result in decline in significant morbidity and mortality in women due to severe anemia and also will reduces it impact on fetal health, decreasing postnatal admission and a healthier community and overall burden on the system.

The limitation of our study was that it only interviewed women coming to OPDs of GYNAE department and it was not a uniform community-based study. Also, we interviewed patients in a tertiary care hospital. Time duration was also a key factor which was less than what it should be.

In Pakistan the prevalence of anemia among pregnant women living in urban areas was reported from 29% to 50% [12]. Some studies have shown that the frequency of Iron deficiency anemia varies in the pregnant women of Karachi (64%), Lahore (73%), Multan (76%) and Kohat (66.6%) [14-16]. The percentage of anemia in Kohat (Pakistan) 66.6 percent in pregnant women, 55.87 percent in non-pregnant married women and 48.4 percent in married young girls [17].

In a study done in district Mardan the overall prevalence rate of iron deficiency anemia in pregnant women was (76.7%). Iron deficiency anemia was most prevalent in the second trimester (45.7%) as compared to first (16.1%) and third (38.2%) trimester pregnancy. Of the anemic cases, 42.6% have low iron stores and 43.5% have serum ferritin in a range of 12-30 ng/ml. In 60% of cases CRP was raised and 72.2% were multiparous. Of the study population, 65% were uneducated and 87% belonged to lower middleclass district Peshawar (8).

REFERENCES

1. Shahab, F., Raziq, F., Shahab, A., & Sikandar, S. (2015). FREQUENCY OF ANAEMIA IN PATIENTS PRESENTING TO TERTIARY CARE HOSPITAL IN PESHAWAR (PAKISTAN). *KHYBER MEDICAL UNIVERSITY JOURNAL*, 7(1), 30-33.
2. World Health Organization. Hemoglobin concentrations for the diagnosis of anemia and assessment of severity. Available from: who.int/vmnis/indicators/haemoglobin.pdf
3. Sattar HA. Fundamentals of pathology: Medical course and step 1. review. Chicago (USA): Pathoma LLC; 2011
4. Sifakis, S; Pharmakides, G. Anemia in Pregnancy. *Annals of the New York Academy of Sciences*. 900 . 2000. (1): 125–136.
5. Lozoff, B. Iron Deficiency and Child Development. *Food and Nutrition Bulletin*. 28(4),2007. S560–S561.
6. Lee SH, Lee SM, Lim NG, Kim HJ, Bae S-H, et al. Differences in pregnancy outcomes, prenatal care utilization, and maternal complications between teenagers and adult women in Korea: a nationwide epidemiological study. *Medicine Baltimore journal* 2016.95(34).
7. Leppälahti S, Gissler M, Mentula M, Heikinheimo O. Is teenage pregnancy an obstetric risk in a welfare society? A population-based study in Finland, from 2006 to 2011. *BMJ Open* 2013; 3(8).e003225
8. Shams S, Ahmad Z, Wadood A Prevalence of Iron Deficiency Anemia in Pregnant Women of District Mardan, Pakistan. *J Preg Child Health*. 2017. 4: 356
9. World Health Organization. The World Health Report 2002: Reducing risks, promoting healthy life. France: WHO Press; 2002.
10. Mei Z, Cogswell ME, Looker AC, Pfeiffer CM, Cusick SE, Lacher DA, et al. Assessment of iron status in US pregnant women from the National Health and

- Nutrition Examination Survey (NHANES), 1999– 2006. *Am J Clin Nutr.* 2011;93:1312-20.
11. Balarajan Y, Ramakrishnan U, Ozaltin E, Shankar AH, Subramanian SV. Anemia in low-income and middle-income countries. *Lancet* 2011.378(9809) : 2123-2135.
 12. Lone FW, Qureshi RN, Emmanuel F. Maternal anemia and its impact on perinatal outcome in a tertiary care hospital in Pakistan. *East Mediterranean Health J.* 2004. 10: 801-807
 13. Mary Cogswell. Bruno de Benoist, Erin McLean, Ines Egli, Mary Cogswell (all Edit). Worldwide prevalence of anemia. 1993-2005.WHO global database on anemia, World Health Organization 2008.
 14. Karim SA, Khurshid M, Memon AM, Jafarey SN. Anemia in pregnancy-its cause in the underprivileged class of Karachi. *J Pak Med Assoc.* 1994. 44: 90-92
 15. Sohail R, Zainab S, Zaman F Prevalence of anemia in obstetrical population. *Ann King Edward Med Coll.* 2004. 10: 146-148
 16. Awan MM, Akbar MA, Khan MI. A study of anemia in pregnant women of railway colony, Multan. *Pak J Med Res.* 2004. 43: 11-14
 17. RiazUllah, Ayaz S, Khader JA, AbedIslam NM, Anwar M, Khan K. Prevalence and Detection of Anemia (Iron Deficiency) in women Population in Kohat, Khyber Pakhtunkhwa, Pakistan. *Life Science Journal* 2013.,(2) 812-815.
 18. Kassebaum N, Jasrasaria R, Naghavi M, Wulf S, Johns N, Lozano R et al. A systematic analysis of global anemia burden from 1990 to 2010. *Blood.* 2014;123(5):615-624.
 19. Weatherall D. The inherited diseases of hemoglobin are an emerging global health burden. *Blood.* 2010;115(22):4331-4336.
 20. Usuki K. IV. Hemolytic Anemia: Diagnosis and Treatment. *Nihon Naika Gakkai Zasshi.* 2015;104(7):1389-1396.

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