FREQUENCY OF ANEMIA IN PATIENTS PRESENTING TO TERTIARY CARE HOSPITAL IN PESHAWAR, PAKISTAN

Faseeh Shahab[1✉], Sehrish Sikandar[2], Aymen Shahab[3], Fazli Raziq[4]

[1✉] Intern, Hayatabad Medical Complex, Peshawar, Pakistan Postal Address: House 146, St. 7, Sector P-1, Phase 4, Hayatabad, Peshawar, Pakistan Email:faseehshahab@gmail.com, Cell # 0333-9151987
[2] Intern, Rehman Medical Institute, Peshawar, Pakistan
[3] First Year MBBS, Khyber Medical College, Peshawar, Pakistan
[4] Professor& Chair, Department of Pathology, Hayatabad Medical Complex, Peshawar, Pakistan
Date Submitted: May 04, 2014
Date Revised: Jan 23, 2015
Date Accepted: Jan 25, 2015

ABSTRACT

OBJECTIVES: To document the frequency of anemia in all patients who presented to out-patient and/or in-patient in a tertiary level hospital in Peshawar PAKISTAN and to find the frequency of various grades of anemia in male and female patients.

METHODOLOGY: This retrospective, chart-based, descriptive, institution-based study was conducted in Department of Pathology, Hayatabad Medical Complex, Peshawar. A total of 16,000 'full blood count' reports were reviewed for this study which were performed from 15th March, 2012 to 15th June, 2012. Simple random sampling was done to select data of 6104 male patients and 1578 female patients. Hemoglobin level <13 mg/dL for males and <12 mg/dL for females was considered as anemic.

RESULTS: Out of a total of 7682 patients, 66.8% (n=5133) were found to be anemic while 33.2% (n=2549) patients had normal hemoglobin levels. There were 4115 male (67.4%) and 1018 female (64.5%) which were found to be anemic. Mean hemoglobin level was 11.64+2.5536 gm/dl for male patients and 11.10+2.1024 gm/dl for female patients. Moderate anemia was more common in female patients (18.5%) as compared to males (16.5%) while mild and severe anemia were more common in male patients as compared to females patients (43% vs. 39%) and (7.6% vs. 7%)] respectively.

CONCLUSION: Frequency of anemia was high in patients presenting to tertiary care hospital in Peshawar. The frequency was slightly higher amongst male patients compared to female patients. Even after excluding the 2 high risk groups i.e. pregnant females and infants, a high frequency rate is very alarming.

KEY WORDS: Anemia, Iron-Deficiency Anemia, Hospital-Based Study.

INTRODUCTION

Anemia has been defined as "a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status".[1] It is considered as an important global health issue with consequences regarding human health, social and economic well being[2]. It is widely prevalent in developing countries and according to World Health Organization (WHO) estimates; two billion of world's population is anaemic[1]. Several complications of anemia have been studied, most notably, the ill effects of anemia in pregnant woman leading to maternal and child complications[3].

Anemia can be caused by a multitude of factors. Nutrient deficiency is by far the most common cause, which refers to inadequate body stores of a single or multiple nutrients needed for hemoglobin synthesis. Iron, folic acid, vitamins (B12) etc have been implicated in causation of nutritional anaemia[4]. Iron deficiency is the common cause of anemia and according to WHO estimates, 20-30% of non-pregnant females and 50-60% of children in developing countries are suffering from anaemia[5]. Other causes of anemia include anemia of chronic disease, hereditary defects leading to hemolysis, conditions resulting in suppression of bone marrow production of red blood cells, infections, worm infestations, chronic ailments, blood loss, etc[6]. These causes vary in different age groups.

The WHO has also laid down the classification of countries with respect to the level of public health significance of anemia: a prevalence of 15% is low, 15-40% is medium and >40% is high.[7] Several studies have been conducted in Pakistan which have reported the prevalence of anemia in pregnant females, children and other segments of population[8]. According to WHO estimates for Pakistani non-pregnant women aged 15-49 years, 51% had blood haemoglobin concentration of less than 12 g/dl and overall mean blood haemoglobin concentration was 11.7 g/dl (95% CI: 11.5-12). In pregnant

Pakistani women aged 15-49 years, 50% had blood haemoglobin concentration of less than 11 g/dl and overall mean blood haemoglobin concentration was 10.9 g/dl (95% CI:10.6-11.2).[9] A lot of work has been done by various researchers regarding the prevalence of anemia and there is plenty of evidence regarding anemia in populations of both genders in Pakistan. There is little evidence regarding anemia prevalence in adult population in Peshawar.

The objectives of this study were to document the frequency of anemia in all patients who presented to out-patient and/or in-patient in a tertiary level hospital in Peshawar and to find the frequency of various grades of anemia in male and female patients.

METHODOLOGY

Study Design and Study Setting:

A retrospective, cross-sectional, chart-based, institution-based study was conducted in Department of Pathology, Hayatabad Medical Complex (HMC); Peshawar. HMC is a 1000-beded tertiary care hospital, which is the third largest hospital of Khyber Pakhtunkhwa province of Pakistan. It receives patients from all over the northern part of country and majority of patients from Afghanistan. The study was approved by the hospitals' Institute Review and Ethics Board (IREB).

Study Sample and Data Collection:

The inclusion criterion was all 'Full Blood Count' reports of patients who presented to Out-Patient and In-patient departments of HMC, Peshawar from 15th March, 2012 to 15th June, 2012. The reports of patients who presented to Out-patient Antenatal clinics (pregnant women) and to Pediatrics department were excluded from the study. Hemoglobin (Hb), white cell count (WBC) and platelet count were determined by using Hematology Analyzer: Sysmex KX-21.

A total of 16,000 reports were reviewed for this study. Simple random sampling was done to collect data. For males, a sample size of 6104 was taken, which produces a two-sided 95% confidence interval with a width equal to 0.010 when the sample proportion is 0.040. For females, a sample size of 1578 was taken, which produces a two-sided 95% confidence interval with a width equal to 0.020 when the sample proportion is 0.040. A total of 7682 reports were included in the study as sample size.

The reference ranges for hemoglobin concentration categories used in this study were according to levels recommended by World Health Organisation[10]. Hemoglobin level above 13 mg/dL for males and above 12 mg/dL for females was considered as normal. Any level below these values was considered as anemic. Hemoglobin between 10-12.9 mg/dL for males and between 10-11.9 mg/dL for females was categorized as 'Mild Anemia'. For both genders, Hb level between 8-9.9 mg/dL was referred to as 'Moderate Anemia' and below 8 mg/dL was considered as severe anemia.

Data Analysis:

Data was recorded and analyzed using Statistical Package for Social Sciences v20.0 (SPSS, Inc., Chicago, IL, USA). Results were recorded as frequencies, means ± standard deviations (SD) and p-values.

RESULTS

There were a total of 7682 patient reports which were included in the study. Thirty three percent (n=2549) of all patients had normal hemoglobin levels

TABLE I: STATISTICAL MEASURES OF HAEMOGLOBIN IN BOTH GENDERS

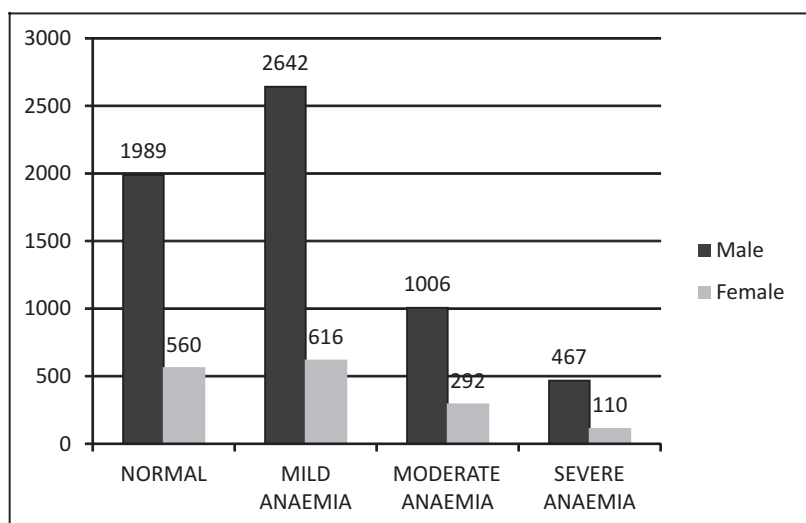|		Male	Female
Mean hemoglobin gm/dl		11.64	11.10
Median		11.80	11.25
Std. Deviation		2.5536	2.1024
Range		17.6	18.9
Percentiles	25	10.0	9.9
	50	11.8	11.25
	75	13.5	12.4

Figure I: Comparison of various grades of anaemia in both genders

while 66.8% (n=5133) were anemic according to the laboratory result of full blood count. Table I shows the various statistical measures of anemia in male and female population.

In our study, hemoglobin levels above 13 gm/dl (for males) and above 12gm/dL (for females) was takes as 'normal' while levels below this were labeled as 'anemic'. There were 4115 male patients (67.4%) and 1018 female patients (64.5%) which were anemic. There were 7 male patients and 6 female patients who had pancytopenia on laboratory investigations and were excluded from the study.

Moderate anemia was more common in female patients (18.5%) as compared to males (16.5%), while mild and severe anemia were more common in male patients as compared to females patients (43% vs. 39%) and (7.6% vs. 7%)] respectively. Figure I shows the comparison of various grades of anemia in both genders.

DISCUSSION

Anaemia is widely prevalent in Pakistan and its prevalence in children and pregnant females has been reported in various WHO reports as well as in local literature. In this study we found a very high frequency of anaemia in male patients in addition to above mentioned groups. Frequency of anaemia in this study is high in both genders in comparison with the available literature[11,12].

National Health Survey of Pakistan (NHSP) estimated that the prevalence of anaemia in whole Pakistani population amongst young men varied from 12% to 28% depending on urban-rural difference and socio-economic status while anaemia in child bearing age women ranged from 38% - 51.5%[11]. In our study, the frequency of anaemia was found to be 67.4% for males and 64.5% for women. The high frequency can be partly due to

the fact that all patients either presented to hospital or were previously admitted. Anaemia is very common in hospitalized patients affecting 30-90% of patients[13]. Anaemia can be due to the disease process itself or can be due to certain drugs especially certain antibiotics and almost all chemotherapeutic drugs, in which case the hemoglobin levels should be regularly monitored and treated accordingly[14,15]. A study conducted in healthy university students in the same city reported anaemia in 1.5% in males and 23.9% in female students[12]. This is in accordance with similar studies conducted elsewhere on healthy university students. The main population groups to suffer from anaemia are infants, pre-school children and pregnant females; therefore the low prevalence of anaemia in healthy university students is understandable[16].

Iron deficiency anaemia has been reported as the most common cause of anaemia[1,17]. Food fortification with iron has been used to prevent anaemia in certain countries with varying results depending on type of food fortified[18]. Assuncao et al reported lack of any increase in Hb levels or decrease in anaemia after wheat fortification with iron in Brazil. Arcanjo et al reported improvement in Hb levels and decrease in anaemia prevalence after using iron-fortified rice[19]. This difference in results with difference type of fortification can be attributed to the fact that phytins present in wheat decrease iron absorption and result in no improvement in haemoglobin levels.

Pregnant women are the most likely population group to suffer from anaemia, especially nutritional anaemia[20]. It is very important to correct anaemia as this is related with several adverse outcomes like low birth weight, preterm delivery, perinatal mortality, etc. Such females are at increased risk for these adversities in subsequent pregnancies. A study conducted by Baig et al reported 90.5%

prevalence rate of anaemia (cut off value of Hb less than 11gm/dL) in 1369 pregnant females presenting to antenatal clinics8. This depicts the scale of problem of anaemia, especially in the semi-urban and rural areas of Pakistan. In our study, we excluded the reports from antenatal clinic; and female population represented in this study was young women, geriatric population and patients admitted in gynaecological wards. The high frequency of anaemia found in female population in this study (64.5%) depicts that it is not only the pregnant females which are at increased risk of anaemia but the female population overall suffers from anaemia. Iron supplements before, during and after pregnancy should be encouraged/ prescribed to all females to avoid the ill effects of anaemia in later stages of life[21].

The strength of this study was the large sample size incorporated for this study. We tried to not include the pregnant females as we excluded all the reports from antenatal clinics. In order to minimise the bias, random sampling technique was applied instead of convenience sampling. Further large-scale, multi-centre research is necessary to elucidate the various age groups vulnerable to developing anaemia, the various risk factors resulting in anaemia, the presenting complaints and the correlation of anaemia with age, gender, socioeconomic status in our population, food fortification with iron should be encouraged to reduce anaemia especially in high risk groups.

LIMITATIONS OF STUDY

There were a number of limitations in this study. This was a hospital based study and only included reports of patients who were advised 'full blood count' investigation. This refers to the population which are at high-risk to develop anaemia. There was no correlation with age of patients, presenting complaints, clinical presentation, socioeconomic status, ed-

ucation level, BMI, dietary habits and any history of blood loss or blood transfusion.

CONCLUSION

It was concluded in this study that there is a very high frequency of anemia in patients presenting to tertiary care hospital in Peshawar. The frequency was slightly higher amongst male patients compared to female patients. Even after excluding the 2 high risk groups' i.e. pregnant females and infants, a high frequencyrate is very alarming and effective strategies need to be adopted to prevent this public health problem. Further large-scale, community based research is needed to precisely investigate the prevalence of anemia in our population.

ACKNOWLEDGMENTS

REFERENCES

1. World Health Organization. Health topics: Anaemia. [Cited on December 30, 2015]. Available from URL: http://www.who.int/topics/anaemia/en/

2. Benoist B. Focusing on anemia: Towards an integrated approach for effective anemia control. Joint statement by the World Health Organization and the United Nations Children's Fund, 2004.

3. Allen LH. Anemia and iron deficiency: effects on pregnancy outcome. Am J Clinical Nutrition 2000;71(5):1280s-1284s.

4. Park K. Preventive and social medicine. 18th ed. Jabalpur (India): M/s Banarsidas bhanot publishers; 2007. p.465.

5. Iron deficiency. Bulletin of the World Health Organization, 1998; 76(Suppl-2):121-123.

6. McKean S, Halasyamani LK, Bennett AL. Hospital medicine: just the facts. New York: McGraw-Hill, 2008; p 260.

7. What works? A review of the efficacy and effectiveness of nutrition interventions ACC/SCN nutrition policy paper no.19. Asian Development Bank Nutrition and Development series no.5/2001.

8. Baig NN, Badruddin SH, Karmaliani R, Harris H, Jehan I, Pasha O, et al. Anemia prevalence and risk factors in pregnant women in an urban area of Pakistan. Food Nutr Bull 2008;29(2):132-9.

9. WHO. The global prevalence of anaemia in 2011. Geneva: World Health Organization; 2015.

10. WHO, UNICEF, UNU. Iron deficiency anemia: assessment, prevention and control, a guide for programme managers. Geneva, World Health Organization, 2001. [Cited on October 11, 2014]. Available from URL: http://www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/WHO_NHD_01.3/en/index.html

11. Pappas G, Akhtar T, Peter JG, Wilbur CH, Khan AQ. Health Status of the Pakistani Population: a health profile and comparison with the United States. Am J Public Health 2001;91:93-8.

12. Khan MT, Akhtar T, Niazi M. Prevalence of anemia among university of Peshawar students. J Postgrad Med Inst 2010; 24(4): 265-269.

13. McKean S, Halasyamani LK, Bennett AL. Hospital medicine: just the facts. New York: McGraw-Hill, 2008; p 260.

14. Shaikh MA, Memon I, Ghori RA. Frequency of anemia in patients with systemic lupus erythematosus at tertiary care hospitals. J Pak Med Assoc 2010; 60(10):822-5.

15. Kullmann T, Culine S. Treatment of anemia in medical oncology. Orv Hetil. 2012 Jun 24;153(25):973-7.

16. Ali A, Fathy GA, Fathy HA, El-Ghaffar NA. Epidemiology of iron deficiency anemia: Effect on physical growth in primary school children, the importance of hookworms. Int J Acad Res 2011;3: 495-500.

17. Cook JD. Diagnosis and management of iron-deficiency Anemia. Best Prac Res Clin Haematol 2005;18: 319-332.

18. Assunção MC, Santos IS, Barros AJ, Gigante DP, Victora CG. Flour fortification with iron has no impact on anemia in urban Brazilian children.Public Health Nutr 2012;15:1-6.

19. Arcanjo NFP, Santos RP, Arcanjo CP, Amancio OM, Braga JA. Use of Iron-Fortified Rice Reduces Anemia in Infants. J Trop Pediatr 2012;58(6):475-80.

20. Irshad G, Kousar S, Jafri SA, Ali I. Iron deficiency anemia significance of serum ferritin in diagnosis in pregnant females of Pakistan. Prof Med J 2011;18: 475-8.

21. Siddiqui IA, Jaleel A, Rahman MA. Preventive Strategy to Control Iron Deficiency Anemia in Children and Adults. J Pak Med Assoc 2003; 53:131-6.

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

FS: Concept, study design, acquisition and analysis of data, drafting the manuscript, final approval of the version to be published

SS & AS: Acquisition of data, drafting the manuscript, final approval of the version to be published

FR: Acquisition of data, critical analysis, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.