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Prevalence of Anaemia among Raigarh District Population –A Hospital Based Cross Sectional Study

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Abstract

Background: Anaemia is the most prevalent nutritional deficiency disorder in the world. It is also a major public health problem in India. It affects all age groups but the most vulnerable are preschool-age children, pregnant women, and non-pregnant women of childbearing age

Methods: we performed a retrospective observational study using routine clinical data from patients attending the outpatient clinics of a district hospital in central India from September 2014 to December 2014. The study included 1240 determinations of haemoglobin between 5-65 years age group. 69.5% of patients were female.

Results and observation: The median haemoglobin concentration was 11.3g/dL (interquartile range (IQR), 9.8–12.4) in females and 12.5g/dL (IQR, 10.6–14.2) in males. Anaemia was present in the majority of children <10 years, women after puberty, and older adults. Children 5-11 years had the highest prevalence of anaemia. The high proportion of microcytic anaemia and the fact that gender differences were only seen after the menarche period in women suggest that iron deficiency was the main cause of anaemia. However, the prevalence of normocytic anaemia increased with age. The results of this study can be used by public health programmes to design target interventions aimed at reducing the huge burden of anaemia in India. Further studies are needed to clarify the etiology of anaemia among older adults. It affects all age groups but the most vulnerable are preschool-age children, pregnant women, and non-pregnant women of childbearing age.

Conclusions: The prevalence of anemia in the developing countries tends to be three to four times higher than in the developed countries. Hence, improvement in dietary habits related to consumption of green leafy vegetables should be included in diet plan. Health education, seminars on menstrual hygiene should be conducted at regular interval.

Keywords: Anaemia, Nutritional deficiency, Lactating mothers, Haemoglobin content, Infections.

Introduction

Anaemia, defined as a reduction in haemoglobin concentration, red-cell count, or packed-cell volume below established cutoff levels, is a widely discussed public health challenge that India is facing.[1] According to the World Health Organization (WHO), anaemia among women is defined as a haemoglobin concentration of <12 g/L for non-pregnant women aged 15 years and above, and a haemoglobin concentration of <11 g/L for pregnant women.[2] In particular, a persistently high level of anaemia among women in India (53% of all women have anaemia as per the National Family Health Survey 2017–2018) is of great concern, and the 2017 National Health Policy

tabled by the Ministry of Health and Family Welfare, Government of India, acknowledges this high burden.[4] Iron deficiency anaemia (IDA) is a common problem among women, primarily due to their recurrent periodic menstrual loss. Demand for iron is higher among pregnant women, and women with anaemia in combination with early onset of childbearing, a high number of births, short intervals between births and poor access to antenatal care and supplementation are likely to experience poor pregnancy outcome. [1]

Global burden of Anaemia is the most common nutritional deficiency disorder in the world. It is a condition that occurs when the red blood cells do not carry enough oxygen to the tissues of the body. WHO defines anaemia as a condition in which the Haemoglobin (Hb) content of blood is lower than normal as a result of deficiency of one or more essential nutrients, regardless of the cause of such deficiencies.[1] Most of the anaemia are due to inadequate supply of nutrients like iron, folic acid and vitamin B12, proteins, amino acids, vitamins A, C, and other vitamins of B-complex group i.e., niacin and pantothenic acid are also involved in the maintenance of haemoglobin level.[2]

Globally, anaemia affects 1.62 billion people, which corresponds to 24.8% of the population. The highest prevalence is in preschool-age children (47.4%), and the lowest prevalence is in men (12.7%). However, the population group with the greatest number of individuals affected is pregnant women (41.8%).[3] In women, anaemia may become the underlying cause of maternal mortality and prenatal mortality.[4] Nearly 50 percent of women of reproductive age and 26 per cent of men in the age group of 15-59 years are anaemia.[5] National Family Health Survey statistics reveal that every second Indian woman is anemic and one in every five maternal deaths is directly due to anaemia. This review will focus on recent advances in our understanding of the burden of anemia in specific sub-groups, the causes and consequences of anemia among women.

Nine out of ten anaemia sufferers live in developing countries, about 2 billion people suffer from anaemia and an even larger number of people present iron deficiency. An alarming 600 million people in South-East Asia are suffering from iron deficiency anaemia, predominantly affecting adolescent girls, women of reproductive age and young children. The condition has a prevalence rate of 74 percent among pregnant women in the region ranging from 13.4 percent in Thailand to 87 percent in India. About 74 percent of pregnant women in Bangladesh, 63 percent in Nepal, 58 percent in Sri Lanka and Myanmar, and 51 percent in Indonesia suffer from anaemia.[6] According to the National Family Health Survey (NFHS)-(III),[7] more than half of women in India (55%) have anaemia, including 39 % with mild anemia, 15 % with moderate anemia and 2 percent with severe anaemia. In studies conducted in developing countries, adolescent anemia as the greatest nutritional problem. In India, 55 % adolescent girls are anaemic.[6,8,9]

WHO has estimated that prevalence of anaemia in developed and developing countries, pregnant women is 14 per cent in developed and 51 per cent in developing countries and 65-75 percent in India alone. Prevalence of anaemia in South Asian countries is among the highest in the world.[9]

Factors

The main causes of anaemia are nutritional and infectious. Among the nutrition factors contributing to anaemia, the most common one is iron deficiency. It is due to a diet that is monotonous, but rich in substances (phytates) inhibiting iron absorption so that dietary iron cannot be utilized by the body.[31] Iron deficiency may also be aggravated by poor nutritional status, especially when it is associated with deficiencies in folic acid, vitamin A or B12, as is

often the case in populations living in developing countries. With regard to infections, malaria is another major cause of anaemia: it affects 300-500 million people, and in endemic areas it may be the primary cause of half of all severe anaemia cases.[8,10] Hookworm infection and in some places schistosomiasis also contribute to anaemia. Approximately 44 million pregnant women have hookworm infections and 20 million people are severely infected with schistosomiasis (http://www.who.int/vaccine_research/diseases/soa_parasite/en/index2.html, retrieved on July 13, 2012. Anaemia can also be due to excessive blood loss, such as gastrointestinal infections associated with diarrhea. The most important water-related causes of anaemia are malnutrition and water-borne or water-related infections. In India, the prevalence of anaemia is high because of low dietary intake, poor iron (less than 20 mg /day) and folic acid intake (less than 70 micrograms/day); poor bio-availability of iron (3-4 percent only) in phytate fiber rich Indian diet; and chronic blood loss due to infection such as malaria and hookworm infestations. The low dietary intake of iron and folic acid coupled with poor bioavailability of iron is the major factor responsible for very high prevalence of anaemia in the country.[14,15]

Screening for anaemia, treatment of anemic women, and availability of food fortification (wheat flour with iron and folic acid), milk sugar and salt with iron to build long term iron stores remains the key to reduce anaemia. Even cooking in cast iron utensils improves iron content in diet.[28] The anaemia control programme needs to be implemented more efficiently in these States. The interstate differences observed may guide the health planner to alter the strategies for control of anaemia as per requirement of the state. In many states like Punjab where male female ratio is still alarming, the issue becomes more serious as females are deprived of almost everything from their birth and being affected at the nutritional front is not uncommon. Need is to change the view point and bring women's health at priority not at family level but at state level as maternal iron deficiency and anaemia render the offspring vulnerable for developing iron deficiency and anaemia right from infancy. [29,30]

According to Capoor, Gade and Chetna Team (2000)[6], the Government of India has initiated several supplementary nutrition programs at the central and state level, to improve the nutritional status of the people and eradicate anaemia. But these programs made very little impact because of they did not take into account the socio-economic and political reasons of anemia among women. For example, most of the programs address nutrition during the first six years of life, and then skip directly to pregnancy and lactation. Adolescence, which is the period of additional nutritional requirement, is not addressed through these programs. Very little space is available to create awareness on the importance of understanding women's nutritional needs throughout various stages of her life, and to ensure that women eat the food that reaches the household.[31,32]

Methods

This hospital-based study was carried out by the Department of medicine, Government Medical college, Raigarh, Chhattisgarh from September 2014 to December 2014.

Aim of the study was to find out the prevalence and the socio demographic risk factors affecting anaemia among the population between 5 to 65 years of the urban and rural population from September 2014 to December 2014 for the period of four months.

Raigarh has a population of approximately four million people. In Raigarh, 72% of the population live in rural areas and 36% are illiterate.[5]

We collected epidemiological data (age and sex) and laboratory data from the hospital database of patients who attended outpatient clinics in the sand period. HIV infected patients were excluded. In patients who had more than one determination of haemoglobin during the study period, only one determination per year of age was allowed in order to avoid repeated measurements in the same patient. We used definitions of anaemia according to recommendation from the WHO.[6] Microcytic anaemia was defined according to cut offs proposed by the US Centers for Disease Control and Prevention (CDC).[7] The study was approved by the Hospital Ethical Committee. Statistical analysis was performed using SPSS Version 22 Statistical Software.

Results

The study included 1240 determinations of haemoglobin from 1440 patients, of which 751 (69.45%) were female. The median haemoglobin concentration was 11.8g/dL (interquartile range (IQR),10.2–13.3)and the median age was 25years (IQR, 12–42).The median haemoglobin concentration was 11.3g/dL (IQR, 9.8–12.4) in females and 12.5g/dL (IQR, 10.6–14.2) in males. Haemoglobin concentrations did not change significantly during the duration of the study (table 1). We presented the median concentration of haemoglobin and interquartile range stratified by age and gender. Children aged 5–11 years had the lowest haemoglobin concentrations. Females and males had similar haemoglobin concentrations until the onset of puberty (around age 13 years). After puberty, females had median concentrations of haemoglobin around 11.5g/dL, whereas males had a rapid increase in haemoglobin concentrations reaching a plateau of about 14g/dL at age 20 years and experienced a progressive decline after age 40 years.

The prevalence of mild, moderate, and severe anaemia was presented in Table2. The highest prevalence of mild and moderate anaemia was seen in children 5-11 years. The highest prevalence of moderate anaemia was seen in children aged 12 years. Both female and male children experienced a rapid improvement in the prepuberty period. After puberty, the prevalence of anaemia was constantly over 50% in females, having older women higher prevalence of moderate and severe anaemia than younger women. Males had a peak of anaemia during puberty and a progressive increase of mild, moderate, and severe anaemia with age. The vast majority of children with anaemia had low MCV and there were no gender differences. In adults with anaemia, males tended to have a higher MCV than women, but differences reduced with age. In general, anaemia was more prevalent in children and women, the proportion of anaemia increased progressively with age in male adults and women after menopause age.

Discussion

In this study, we observed an increased prevalence of anaemia with age. Interestingly, the proportion of normocytic anaemia was highest in older adults, suggesting that other causes than iron deficiency might have contributed to the high prevalence of anaemia in this group. Recent studies have shown the poor bioavailability of vitamin B12 in the typical Indian vegetarian diet[14] and substantial prevalence of vitamin B12 deficiency in Indian patients with anaemia.[17,18,19] However, new studies investigating the etiology of anaemia among older adults are needed.

In a study in rural preschool children by Luxmi et al 99% children were found to be anaemic.[25] Another study by Chaturvedi S et al shows that 73.7% adolescents were anaemic.[26] In a study by Shah BK et al among the adolescent girls of Nepal, the prevalence of anaemia (68.8%) was found to be higher than that of the Indian females as in our study (41.62%).[27,32]

The overall prevalence of anemia was found to be 35.1%. Similar prevalence is reported by CMS Rawat et al.[20] at Meerut. A higher prevalence was noted by J Rajaratnam et al.[21] in Tamil Nadu. Toteja GS et al.[22] found 90.1% prevalence of anemia among adolescent girls from 16 districts of India, with 7.1% having severe anemia. In this study, a significant association of anemia was found with socio-economic status, which may be due to the availability of high quality food with better socio-economic status. A significant association of the prevalence of anemia with educational status of parents reflects better awareness among literate mothers, as well as better socio-economic conditions. None of the subjects had severe anemia. Bulliyy et al.[23] found 96.5% prevalence among non school going adolescent girls in three districts of Orissa, of which, 45.2%, 46.9%, and 4.4% had mild, moderate, and severe anemia. They found significant association between Hb concentration and the educational level of girls, their parents' family income, and body mass index. In the present study, mean height and mean weight of subjects with anemia was significantly less than subjects without anemia, which suggests that anemia affects the overall growth of adolescents. The majority of subjects with anemia in the present study (25.4%) had a microcytic hypochromic picture in the peripheral smear suggestive of iron deficiency anemia, while 4.7% of subjects had a dimorphic picture. Khanduri et al.[24] found peak incidences of megaloblastic anemia in the age group of 10–30 year olds (48%) with female preponderance (71%) in India.[32]

Conclusions

The overall prevalence of anemia among adolescent females was found to be 35.1%. It is seen that anemia affects the overall nutritional status of adolescent females. A significant association of anemia with socio-economic status and parents' educational status suggests a need to develop strategies for intensive adult education and to improve the socio-economic status of the population through poverty alleviation programs. This should be supported by programs for the prevention of anemia among adolescent girls through nutrition education and anemia prophylaxis.

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Tables

Table 1: Haemoglobin concentrations (g/dL) for the diagnosis of anaemia and assessment of severity according to the World Health Organization.

Age in years	Mild	Moderate	Severe
5–11	11–11.4	8–10.9	<8
12–20	11–11.7	8–10.9	<8
Female >20	11–12.9	8–10.9	<8
Male >20	11–13.6	8–10.9	<8

Table 2: Degree of anaemia according to age.

Age in years	Anaemia				
	Mild	Moderate	Severe	No	Total
5-11	80(6.5 %)	231(18.6%)	27(2.2%)	87(7.1%)	1240
12-20	54(4.3 %)	213(17.1%)	12(0.6%)		
21-30	40(3.2%)	69(5.5%)	27(2.2%)		
31-40	50(4.1%)	99(7.9%)	15(1.2%)		
41-50	33(2.7%)	70(5.6%)	19(1.6%)		
>50	30(2.4%)	93(7.6%)	5(0.4%)		
Total	284(23.2%)	770(62.3%)	101(8.2%)		

Table 3: SD and p value according to age.

Age	Mean	S.D.	p- value
5-11	9.75	1.16	0.066
12-20	9.97	1.04	
>20	10.05	1.20	

Table 4: SD values and p value according to gender.

Gender	Mean	S.D.	p- value
Male	9.91	1.13	0.028
Female	9.71	1.12	