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Study of Anemia in Vadodara Population, Western India

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Abstract: ***Background: The distribution of anemia prevalence and risk factors among adults in vadodara population. A cross-sectional study was conducted at Vadodara, Western India during 2009 to 2010. To investigate the prevalence and predictors of anemia among adults this study done.(> 18 years old). Materials and methods: A cross-sectional community based survey was conducted in an SBKS Medical College and Hospital, Pipariya, Vadodara. A total of 149 subjects were included in this study. The study took place from October 2009 to March 2010 (6 months). Results: The prevalence of anemia, is 57adults had anemia; 23 (40.1%); 27 (47.39%) and 17(29.82%) had mild, moderate and severe anemia, respectively. In analyses, male vs. female gender (P = 0.2), age (< 50 yrs Vs ≥ 50 years) (P = 0.6), rural vs. urban residency (P = 0.8), educational level < secondary level vs. ≥ secondary level (P = 0.7) were not associated with anemia. Conclusion: There was a high prevalence of anemia is found in this study. Anemia affected adults regardless to their age, sex. But anemia affects specially in laborers people and low educational level. Therefore, anemia is needed to be screened for routinely and supplements have to be employed in this setting.***

Keywords: Anemia, Adults, Prevalence, Screening, hemoglobin.

1. Introduction

Anemia is the most common blood disorder, and according to the National Heart, Lung, and Blood Institute, it affects more than 650 million people worldwide in India, Findings of the new Global Nutrition Report 2017place India at the bottom of the table. In India, more than half (51%) of all women of reproductive age have anaemia, whereas more than one in five (22%) of adult women are overweight. In 2016, the report showed that nearly 48% of women in India were anaemic, low awareness, illiteracy and practice of putting the family before self, this may lead to women more to anemia. Data from the National Nutrition Monitoring Bureau (NNMB-2003) indicate that in India nearly 75% of the pregnant mothers are anemic. For the eight states for which data is available, anemia among pregnant mothers ranges from a low of about 50% in Kerala, to a high of about 84% in Madhya Pradesh.Anemia is a major public health problem, especially in developing countries 1.

It is common in adult and the prevalence of anemia is increasing with advancing age .Many people are at risk for anemia because of poor diet, intestinal disorders, chronic diseases, infections, and other conditions. Women who are menstruating or pregnant and people with chronic medical conditions are most at risk for this disease. The risk of anemia increases as people grow older. Therefore, the aim of this work was to investigate the prevalence and predictors of anemia among adults. So Factors affecting anemia to the populations are great concern.

2. Material and Methods

An observational study was carried out at Urban Health Center, Vadodara City. The area was selected by simple random sampling.

This was a cross sectional community- based survey of adults (>18 year old) residents in Vadodara, Western India in 2009. 149 adults were enrolled in the study and there was no exclusion criterion other than pregnancy. Participants selection was random and non consecutive. To have an effective coverage, it was decided to cover the whole area. The study was approved by the ethical committee of the SBKS Medical College and Hospital in PIPARIYA, VADODARA.

A house-to-house survey was carried out by the investigator .After informed consent a pre-tested questionnaire was used to gather socio-demographic data (age, sex, educational level, residence, ethnicity and occupation), medical history of chronic illness such as hepatic disorders, renal disease, thyroid disease, arthritis, blood disorders or diabetes mellitus and awareness of their hemoglobin level.

For hemoglobin estimation, 20 µl of capillary blood was taken in a hemoglobinometer pipette and transferred HEMOGLOBIN TUB E which contains 1% HCL. Hemoglobin estimation was done by the Sahli's acid hematin method.

For typing of anemia, a thin blood smear was prepared on a clean glass slide and allowed to dry. Smears were stained with Leishman's stain and examined under the high power of the microscope. A lab technician and pathologist was pursued for blood taking and examining the slide. Anemia was defined according to the WHO criteria as a hemoglobin concentration lower than 12 gm/dl in women and 13gm/dl in men.

Criteria for anemia

Anemia was defined as mild, moderate and severe when hemoglobin concentration was 10-12 g/dl, 7— 10 g/dl and<7 g/dl respectively. Anemia was the dependent variable and socio-demographic characteristics with their referral groups were independent variables. Confidence intervals of 95% were calculated and P<0.05 was considered significant.

3. Result

Blood test results of 149 adult persons were included in the study. Out of these 149 subjected, 74(49.6%) were females. A statistically significant association of anemia was found with the socio-economic status of study subjects.The entire prevalence of anemia among the surveyed subjects was 38.24% (57/149) and it was 25.4% and 27.5% among male and female, respectively (P=0.2>0.05)

Table 1: Eating habit Status of Study participants

Status	Anemic (%)	Non-anemic (%)	Total (%)
vegetarian	65(43.6)	36(24.16)	101(67.7)
Non vegetarian	00	6(4.02)	6(4.02)
Only egg	20(13.42)	22(14.76)	42(28.18)
Total	85(57.02%)	64(42.9%)	149(100)

Type of eating habits is associated with anemia. Among these 65 (43.6%) participants were vegetarian.

Table 2: Comparison of mean height and mean weight of subjects

variables	Anemic (n= 95)		Non-anemic (n=54)	
	Male	Female	Male	Female
height (cm)	145±25	110±10	165±16	115±10
weight(kg)	60±7.5	37±3.5	50±8	40±9.5

It was found that means height and mean weight of subjects with anemia is less as compared with that of subjects without anemia; the difference was statistically significant.

Majority of patients-126(97.7%) were vegetarian. The mean height anemic male group was 145±25 and female was 110±10 of 95 diagnosed participants was 49.2 ± 3.2 (mean ±SD) years. Age (< 50 yrs Vs ≥ 50 years) is non-significantly associated with anemic status. (P =0.6>0.05)

Table 4: Family Income Status of Study participants

Family Income	Anemic (%)	Non-anemic (%)	Total (%)
<3000	60(65.1)	39(34.9)	99(64.3)
3000-5000	14(33.3)	11(66.7)	25(6.9)
5000-15000	13(36.3)	12(63.7)	25(8.6)
Total	87(36.4)	62(63.6)	149(100)

65.1% was anemic whose family income was <3000 .significant difference is seen between Anemic Group of less income & higher income status.

Table 4: Social status co-relates with anemia

Factor	Participants n=149	Anemic	Non anemic
Socioeconomic status			
Upper middle	75	43	32
Lower middle	40	22	18
Lower	34	27	7

None of the subjects belonged to socio-economic strata I (upper) and V (lower)

Table 5: Anemia Status of Study participants

Severity of anemia	Frequency (%)
Mild (Hb =10-12g/dl)	23 (40.1%)
Modearate (Hb =7-10 g/dl)	27 (47.39%)
Severe (Hb=<7/dl)	17 (29.82%)
Total	57

Out of 149 subjects, 52 subjects (69.2%) had mild anemia Hb 10 to < 12 gm%] while 50 subjects (30.8%) had moderate anemia [Hb 7 to < 10 gm%]. 47 subjects had severe anemia.

In analyses, vegetarian vs.non -vegetarian (P = 0.002), income (P=0.6), socio-economic statusp=0.001 were associated with anemia.

4. Discussion

The overall prevalence of anemia Out of 149 subjects, Anemia was mild, moderate and severe in52,50,47, respectively. The mean hemoglobin level was 10.5 ±2.2 gm/dl of Total 149 Participants. Almost all 96.3%) of the anemic subjects perceived themselves as non-anemic ones. History of tuberculosis and renalinsufficiency were reported in 1 and 4 anemic persons, respectively. While none of the patients had hookworms, two of them had urinary tract infections andone of them had P. falciparum malaria.

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 eating habits status of participants reflects better awareness among literate mothers, as well as better socio-economic conditions.

The present study was aimed to evaluate the prevalence of anemia in vadodara population. The results shown anemia affects adults in lower economic status, lower income group, and food habits nd residence status, which are increasing with chronic illness. In the current study, only one patient had P. Falciparum malaria. The area is characterized by unstable malaria transmission. Therefore, there is a need to re-evaluate or strengthen the current strategies to control anemia among adults in this setting. In this study also found significant association between Hb concentration and the 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 population

This study revealed that, anemia is a major health problem in Vadodara, Western India. According to the WHO, a severe public health problem exists if the prevalence of anemia is ≥40% in any group[1]. The prevalence of anemia usually increases incidence of chronic illness and poor nutritional status in old people [8,9].Anemia was reported in 16%–44% of patients with Tuberculosis[10,11].Like the tuberculosis itself, other infections might lead to anemia by Suppressing erythropoiesis by Inflammatory mediators[12] In the current study, only four patient having malaria treatment running on. The area is known for unstable malaria transmission.

The major limitation of our study is that we didn't find any particular cause for anemia. We have to investigate the

possible causes of anemia to facilitate the strategies for the preventive programs. The most common cause of anemia worldwide in elderly is anemia of chronic disease [5]. Iron deficiency is frequently seen in elderly, typically as a result of chronic blood loss through GIT16. Vitamin B12 deficiency, folate deficiency, MDS are among other causes of anemia inelderly[17].

5. Conclusion

There was a high prevalence of anemia in this setting, anemia affected adults because of their food habits, lower income status .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. Therefore, anemia is needed to be screened for routinely and supplements have to be employed in these settings.

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