Prevalence of Anemia in College Going Females in Delhi

Pranav Jain, MSIV[1]; Prachi Bagla, Ph.D[2];
Haritma Chopra, Ph.D[3]; Sarah Hadique MD, FCCP[4]

Anemia is one of the leading health care problems in developing countries especially in pre-school children and women of reproductive age group [1]. In 2011, 29% (496 million) of non-pregnant women and 38% (32.4 million) of pregnant women aged 15–49 years were anemic [2]. The prevalence of anemia was highest in south Asia and central and west Africa [2]. Strong efforts have been made at the government level with or without international assistance to reduce the burden of anemia in this group to decrease the risk of maternal and neonatal adverse outcomes. This has resulted in considerable reduction in the prevalence of anemia in some settings. However, overall progress has been insufficient. A recent study revealed that the prevalence of anemia has not significantly decreased over the past several decades in wide geographical areas of India [3]. To contribute towards the World Health Assembly's target of a 50% reduction of anemia in women of reproductive age by 2025 [4] a health camp offered free hemoglobin measurement to female students attending a college in University of Delhi. Results and implications of the findings are discussed below.

Methods

In September 2019, students attending both regular and non-collegiate classes in Maitreyi College, University of Delhi were invited to participate in a voluntary test of hemoglobin level. The camp, labeled Anemia: Test-Treat-Talk (T3) camp was organized as a part of Poshan Abhiyan by Integrated District Health Society, New Delhi District, Government of Delhi. Approval for this was obtained from the appropriate college authorities.

The measurement was made with a digital hemoglobin meter using capillary blood. No additional information on the economic status, dietary, or medical history was obtained in this preliminary study. Age was the only variable included in the database.

A total of 678 students consisted of the final sample. The study used the criteria by Wold Health Organization to classify subjects as anemic: mild, moderate, and severe.

The proportions and 95% confidence interval (CI) were calculated using standard methods. Fisher-exact test was used to compare the proportions. A 2-sided p value of < 0.05 was considered statistically significant.

1. West Virginia University School of Medicine, West Virginia, United States
2. Associate Professor, Maitreyi College, University of Delhi.
3. Officiating Principal, Maitreyi College, University of Delhi.
4. Associate Professor, Director of Fellowship Program, Department of Pulmonary and Critical Care, West Virginia University, West Virginia, United States

Results

The median age of students comprising the sample was 19 years (range 17-22 years).

As per the WHO criteria a female with a hemoglobin level < 12 gram/dl is considered anemic. Anemia is classified as mild, moderate and severe when levels are 11-11.9 gram/dl, 8-10.9 gram/dl, and less than 8 gram/dl respectively. Using these criteria, anemia was detected in 371 students (54.7%; 95% CI 50.9-58.4%). Mild anemia was detected in 188 students (27.7%; 95% CI 24.2-31.2%), moderate anemia in 173 students (25.5%; 95% CI 22.4-28.9%) and severe anemia in 10 students (1.5%; 95% CI 0.8-2.7%).

A separate analysis performed for regular college students and non-collegiate students is shown in Table 1. Of 678 students, 437 were regular college students and 241 were non-collegiate students. Anemia was significantly more common (p=0.029) in regular college students (57.9%, 95% CI 53.1%-62.6%) than in non collegiate students (49%, 95% CI 42.7-55.2%). This difference was mainly driven by a higher prevalence of mild anemia in regular college students compared with non-collegiate students (30.4% versus 22.8%, p=0.039). The prevalence of moderate and severe anemia was similar in these two groups of students.

Discussion

The main finding of this study is a 55% prevalence of anemia in female students of this college. High prevalence of anemia found in women attending college is strikingly similar to that seen in other studies in which more than one-half of Indian women between the ages of 15 to 50 are found to have anemia [5,6]. Economic hardships, inadequate nutrition, repeated pregnancies, high burden of intestinal worms, and malaria alongside a lack of adequate medical care and education are important causes of the high prevalence of anemia among Indian women. However, these factors do not fully explain such high prevalence of anemia in our students, since they come

Table 1 : Prevalence of Anemia in Female College Students

	All students (n=678)	*College students (n=437)*	*Non-Collegiate students (n=241)*	*p-value**
Normal	307 (45.3%)	184 (42.1%)	123 (51%)	
Anemia	371 (54.7%)	253 (57.9%)	118 (49%)	P=0.029
Mild Anemia	188 (27.7%)	133 (30.4%)	55 (22.8%)	P=0.039
Moderate Anemia	173 (25.5%)	112 (25.6%)	61 (25.3%)	P=1.0
Severe Anemia	10 (1.5%)	8 (1.8%)	2 (0.9%)	P=0.5

* Comparison is made between college students and non-collegiate students

from diverse social backgrounds, receiving university education, are high scorers and have access to information. We must then explore why more than half in this group are anemic.

The results of this study are not a chance occurrence. Other studies performed in young women attending college in other settings and geographical areas seem to corroborate these findings. For instance, in one study performed in 2017, anemia was found in 42 of 165 (34%) of female medical students aged 17-22 years attending a medical college in Karnataka, India [7]. The problem is not limited to the Indian subcontinent. Anemia was detected in 21% of female students between ages of 18-22 years receiving University education in Thailand [8] and 70% of female students attending a Science and Technology University in Bangladesh [9]. Similar findings in our study point toward a systematic problem of anemia in this age group that needs to be recognized as a public health issue.

There are important immediate implications of anemia in young college students. Anemia causes fatigue, weakness, and lack of concentration. There is evidence for difficulty with cognitive development in children and adolescents with iron deficiency and iron deficiency anemia [10]. In some studies, the presence of anemia was also associated with poor academic performance [7]. Presence of anemia is also likely to pose difficulties in participation in competitive sports and other extra-curricular activities that are a vital component of college education [11].

Another major concern is that anemia is clearly associated with poor maternal and fetal outcomes [12]. In developing countries, anemia is an important preventable cause of maternal mortality [13]. Pregnancy and breast feeding are well known to worsen pre-existing anemia. Iron deficiency in the mother is also closely linked to iron deficiency in their infants [14]. This creates a vicious cycle that continues to increase the burden of anemia among vulnerable sections of the population making it important to resolve this issue.

The cause of anemia in young college students is not directly addressed in the current study. However, in extrapolating from other studies, iron deficiency is likely to be the most common reason. A more detailed evaluation is needed to determine whether other micronutrient deficiencies are also involved. Excessive menstrual blood loss and a diet that is inadequate in iron are the most obvious co-conspirators. Even though iron is available in green leafy vegetables, a strict vegetarian diet generally fails to meet daily iron requirements, especially in face of excessive blood loss. Furthermore, less iron is absorbed from human gastrointestinal tract from vegetarian sources than from non-vegetarian food products [15]. Surveys have shown that only one-quarter of Indian women consume pulses, meat, fish or eggs on a regular basis.

Tackling this problem of anemia will need a collective effort from public and private enterprises. It is likely that different strategies will be needed for different sections of the population. Basic interventions such as improving diet, iron supplementation, and reducing burden of intestinal worms etc. are common

goals. Effective implementation of such interventions for different geographical areas and economic strata would require a variety of innovative ideas. Though one of the interventions proposed to reduce anemia among Indian women is to reduce illiteracy and improve their educational levels, yet high prevalence of anemia among college girls suggests that education alone may not be sufficient in this regard. An unexpected finding in this study is a higher prevalence of anemia in regular college students compared to non-collegiate students. This is despite the general impression that students enrolled in non-collegiate programs come from relatively more underprivileged backgrounds and lower socioeconomic strata in comparison to regular college students. Poor dietary habits in regular college students may partly explain this difference but this needs to be addressed in future studies.

In moving forward, important initial steps are to acknowledge this problem and to have a collective will to combat it. More studies are needed covering wider geographical areas to determine the prevalence and root cause(s) of anemia among young women receiving college education in India. Although iron deficiency anemia is the most likely culprit, targeted testing of a representative sample is needed to identify contribution from other causes such as folic acid or vitamin B12 deficiency. A policy decision to screen for anemia at the time of admission to college should be given serious consideration. Awareness of the problem and early screening together with simple nutritional advice and iron supplementation may go a long way in correcting anemia in young college students. The key is to make simple, well thought out, and cost-effective interventions. Correction of anemia in young college girls is a worthwhile undertaking from both an individual and public health viewpoint.

"What we hope ever to do with ease, we must learn first to do with diligence." Samuel Johnson

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Najma Akhtar got appointed as Vice Chancellor of Jamia Millia Islamia as the first woman to hold the post, first woman to head any central university In National Capital.

-19th April, 2019, Hindustan Times