

Research Article

Prevalence of anemia among health science students of a university in South India

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ABSTRACT

Background: Anemia due to iron deficiency continues to be the major public health problem in developing as well as developed countries affecting quality of life and work capacity of large population throughout the world. It is being observed that prevalence of anemia is more in students of both the genders due to several factors like improper nutrition intake, socio-economic background etc. The objective of our study was to determine the prevalence of anemia among health science students of a private university in South India.

Methods: A total of 568 university students between 18-45 years participated in the study. Patients who underwent major surgery less than three months before and who had donated blood within the last three months were excluded. Baseline characteristics of all the patients were recorded. 1.5 ml of blood was collected from all the study patients for complete haemogram test. WHO criterions were taken for determining severity of anemia with determined hemoglobin (Hb) concentration.

Results: Among the study subjects, 43% (n=237) had anaemia as per the WHO criteria. There was a significant preponderance of female students with anaemia as compared to males (97 vs. 68%, p=0.0001). Anaemic subjects had a higher risk of bleeding disorders as compared to non-anaemic subjects (16 vs. 12%, p=0.0001). When assessed by WHO criteria of anemia severity, majority of the anemic subjects had mild anemia and only less than two percent had severe anemia.

Conclusions: Present study showed the prevalence of anemia among university health science students to be 43%. The need of the hour is to provide health education on the ill-effects of anemia and the life-style modification particularly with respect to eating habits along with nutritional supplementation.

Keywords: Anemia, Female, India, Prevalence, University health science students

INTRODUCTION

Anaemia is 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 Hemoglobin is an iron rich protein present in red blood cells which helps red blood cells to supply oxygen from lungs to the rest of the tissues. Hence reduction in this iron protein debar proper oxygen supply to tissues and organs causing shortness of breath, dizziness, or headaches and fatigue.²⁻⁵ Factors

such as nutrition deficiency with iron, infections like hookworm, schistosomiasis and malaria and hemoglobinopathy due to sickle cell disorder and thalassemia accelerates anemia. However anemia due to iron deficiency continues to remain the commonest cause of anemia.⁵⁻⁸ Anemia due to iron deficiency expedites adverse outcomes such as maternal and infant mortality, IUGR and heart failure. Females of child bearing age, adolescence girls and children are obviously at a greater risk in developing countries.⁹⁻¹² Anemia is a common and major public health problem affecting quality of life and

work capacity of large population throughout the world.^{9,11,12} Report of a survey done by WHO showed that in 2011, the highest prevalence of anaemia was in children (42.6%, 95% CI: 37-47), and the lowest prevalence was in non-pregnant women (29.0%, 95% CI: 23.9-34.8). Further the global prevalence of anaemia for pregnant women was 38.2% (95% CI: 33.5-42.6) and for all women of reproductive age was 29.4% (95% CI: 24.5-35.0).

Considerably severe anaemia was associated with worse mortality and cognitive and functional outcomes in 2011 and its prevalence in children and women ranged from 0.9% to 1.5%.³ According to WHO prevalence of anemia is highest in South Asia in the world and India has the maximum prevalence of anemia among the South Asian countries. In India the higher prevalence of anemia is in adolescent girls and is substantially higher in the late adolescents. A significant association between anaemia and the socio-economic status was also observed.¹¹ In rural India higher prevalence of anemia due to iron deficiency was seen among children less than ten years of age followed by women and older adults.¹³ Low socio economic status in both rural and urban set up in India also leads to high prevalence of anemia.¹² Hence our objective is to find the prevalence of anemia among health science students of a private university in South India.

METHODS

This study was a across sectional observational study that was conducted in the Department of General Medicine at

SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India between January 2016 to July 2016. The study was approved by the SRM Institute Ethics Committee and written informed consent was taken from all who participated in the study. None of the students were directly under the control of any investigators so as to prevent including subjects with diminished autonomy.

The total number of subjects enrolled in the study was 568, out of which 455 were female and 113 were male. We included study participants who were between age group of 18-45 years and studying health science subjects such as nursing, occupational therapy and physiotherapy in the university.

We excluded subjects who underwent major surgery less than three months before and who had donated blood within the last three months. 1.5 ml of blood was collected from all the study patients for complete haemogram test. The hemoglobin concentration was measured using automated SLS-Hb kit. Information about the subjects was collected in patient's questionnaire. The WHO criterion was taken for determining the severity of anemia with determined hemoglobin (Hb) concentration.⁹

RESULTS

A total of 549 subjects of either gender, which included students from various health disciplines such as nursing, occupational therapy and physiotherapy, participated in the study after obtaining informed consent.

Table 1: Baseline characteristics of study patients.

Characteristics	Total population (n= 549)	Anemic subjects (n=237)	Non anemic subjects (n=312)	P value
Age	19.41±2.78	19.46±2.62	19.29±2.66	0.44
Female (%)	79.1%	96.61%	68.37%	0.0001
Residence	52.8	95.0%	44.4%	0.34
Eating habits	90.1	9.74%	8.30%	0.65
Beverage	77.7	77.54%		0.72
Bleeding disorder	13.2	15.67%	11.50%	0.000
Family history	9.4	11.86%	8.62%	0.123
Worm infestation	1.7	2.54%	1.27%	0.21
Blood transfusion	3.3	2.11%	4.47%	0.10
Hemoglobin	12.27±1.84	10.71±1.185	13.45±1.30	0.0001
WBC	8659.7±2111.1	8407.6±2016.82	8849.84±2163.31	0.01
RBC	4.49±0.51	4.23±0.42	4.68±0.49	0.000
Neutrophils	60.39±8.60	60.45±8.04	60.27±9.01	0.70
Lymphocytes	32.24±7.75	32.19±7.95	32.28±7.62	0.88
Eosinophilis	3.57±3.39	3.59±2.86	3.56±3.75	0.90
Monocytes	3.31±1.16	3.88±1.16	3.94±1.17	0.53
Platelet	300553.73±70267.34	3.1664±72814	288571±6507	0.0001
PCV	37.44±4.49	33.74±2.88	40.24±3.33	0.0001
MCV	83.02±7.86	80.00±8.71	85.29±6.26	0.0001
MCH	26.87±3.46	24.98±3.58	28.30±2.58	0.0001
MCHC	32.15±1.53	31.16±1.49	32.90±1.06	0.0001

Since data was missing for 19 subjects, they were excluded from the study. Among the study subjects, 43% (n=237) had anaemia as per the WHO criteria. We compared the different baseline characteristics and potential risk factors between subjects with and without anaemia (Table 1).

Table 2: Severity of anemia among the female students.

Severity	Frequency (%)
Normal	226 (49.8%)
Mild	112 (24.7)
Moderate	96 (21.1)
Severe	8 (1.8%)

There was a significant preponderance of female students with anaemia as compared to males (97 vs. 68%, $p=0.0001$). Anaemic subjects had a higher risk of bleeding disorders as compared to non-anaemic subjects (16 vs. 12%, $p=0.0001$). Subjects with anaemia had lower PCV, MCV MCH, and MCHC ($p=0.0001$).

There was no significant difference in the type of residence, nutritional status, beverage consumption and socioeconomic background. The severity of anemia based on WHO criteria was assessed among the female participants of our study. As can be seen in Table 2, majority of the anemic subjects had mild anemia and only less than two percent had severe anemia.

DISCUSSION

Present study showed that prevalence of anaemia among university students undergoing different health science courses was 43%. The percentage of female students with mild anaemia was 47.6%. There have been several studies that have assessed the prevalence of anaemia in different populations within the country. In a study by Panath et al performed among 273 female students in Wardha district, Maharashtra, the prevalence of anaemia was 53%.¹⁴

In a study done by Babita et al among the nursing students in Punjab, the prevalence was 94%.¹⁵ In contrast, the study performed among medical students in Chhattisgarh showed the prevalence of anemia at a much lower rate of 30%.¹⁶ A lower prevalence of 19% was also reported in a government medical college among female students in Kerala.¹⁷

Thus it becomes obvious that there is a high degree of variability in the prevalence of anaemia among the different studies conducted. The high variability of anaemia that is reported among the study could be attributable to different factors such as socioeconomic background, awareness about nutrition, figure - consciousness and lifestyle. Although it is generally assumed that students residing at hostel tend to have a poor eating habits, our study showed that there was no

difference in the prevalence of anaemia between day scholars and hostellers. An earlier study done among medical students in Kerala did show a difference in anemia prevalence between day scholars and hostellers with the latter showing a higher percentage.¹⁷ Thus it appears that among our study subjects, external factors such as residential status seem to have a lesser influence on anemia status.

One of the common reasons for anaemia among young women is the increase prevalence of menstrual bleeding. In present study, subjects with anemia had a greater propensity for heavy menstrual bleeding. It is not known if these subjects were treated with iron supplements. Considering the fact that all our study subjects were doing paramedical courses, it is intriguing that preventive measures were not the norm such as consumption of iron tablets. The main risk factor causing anaemia was menstrual flow more than five days and passing of clots during menstrual cycle. Duration of menstrual flow was found to be a predictor of anaemia in a multivariate analysis.¹⁷

In present study majority of the female participants had mild to moderate anemia. This finding is an agreement with earlier studies that have reported mild to moderate anemia among college students. For example a study by Verma et al reported that out of 187 girls, 83 (44.38%) were mildly anaemic, 26 (13.9%) were moderately anaemic and 5 (2.67%) were severely anaemic.¹⁸ Similarly in a study done by Bano et al, 36.8% were moderately anemic and 8.0% were mildly anemic.¹⁹

While it is heartening to note that only a negligible percentage of patients have severe anemia, it does remain a cause of concern, considering the fact that, these are students who are expected to have a higher awareness of anemia and its consequences. As these students are doing courses in paramedical sciences, it is expected that they are well aware of the potential complications of anemia particularly during pregnancy and child birth. Hence appropriate measures and interventions need to be performed to ensure that these future health care providers do not have to endure the ill effects of anemia in the long run.

Limitations

We did not identify the cause for anemia by further detailed evaluation due to limitation of resources. Future studies should be directed towards exploring the serum iron and ferritin stores in subjects.

CONCLUSION

Present study showed that the prevalence of anemia among university health science students was 43%. It is essential that appropriate preventive interventions such as health education, lifestyle modification and nutrition supplementation be carried out in this population so as to

reduce the morbidity of anemia and its complications in high risk settings.

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Conflict of interest: None declared

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