

Anemia among adolescents in urban field practice area of Rajarajeswari Medical College, Bangalore

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Abstract: *Background:* Anemia is a public health problem in developing countries which affects both male and female adolescents. 50% of all anemia's is attributable to iron deficiency. *Methodology:* A Cross-sectional study done in urban field practice area of RRMCH over a period of three months was conducted on 220 adolescents aged between 10-19yrs (both male and female). Data was collected using a semi-structured questionnaire with emphasis on variables like socio-demographic profile, history of passing worms in stools and menstrual history for females. Hemoglobin was estimated by using Sahli's hemoglobinometer. *Data analysis:* SPSS V 20. *Results:* Occurrence of anemia in our study was 47.7% i.e.; (105 of 220) of which, 61(58.1%) were males and 44(41.9%) of them were female adolescents. Majority of the adolescents had moderate anemia (60%), mild anemia (38.1%) and severe anemia (01.9%). Some of the factors contributing to anemia were menorrhagia, history of passing of worms in the stools which were statistically significant. *Conclusion:* The study highlights the prevalence of anemia not only among the adolescent girls, but the risk is evenly distributed for the boys too. There is a need to reach this adolescent population through school approaches through nutrition education and distribution of iron and folic acid supplementation.

Keywords: Anemia, Adolescents, Urban Area, Cross –Sectional Study

Introduction

Adolescence has been defined by World Health Organization as the life spanning the ages between 10-19years [1]. It is a formative period of life when the maximum amount of physical, psychological and behavioral changes take place. During the growth spurt the risk of iron deficiency anemia appears for both boys and girls [2] after which it subsides for boys but remains for girls because of menstrual blood loss. Anemia affects the present health status, has an impact on overall development and learning ability and also has effects in future pregnancy contributing to both infant mortality and maternal deaths [3].

Iron requirements peak during adolescence due to rapid growth. In developing countries parasitic infections and other infectious diseases are more common which peak the requirement of iron in the human body [4]. Anemia is a public health problem not only among women, infants and young children but also among the adolescents [4]. Data about the prevalence of anemia both among the male and female adolescents are

limited in our field practice area. Hence an effort was made to study the prevalence of anemia among the adolescents with the following objectives.

1. To estimate the prevalence of anemia among the adolescents in urban field practice area.
2. To know some of the factors influencing the prevalence of anemia among the adolescents.

Material and Methods

This study was conducted by Dept of Community Medicine in urban field practice area of Rajarajeswari Medical College and Hospital, Bangalore. It was a cross-sectional study carried for three months duration.

The study population included the adolescents aged between 10-19 yrs (both male and female) who were willing to participate in the study. Pregnant adolescent girls were excluded from the study. As per National

Family Health Survey –III, prevalence of anemia among the adolescents was 56%. Considering this as prevalence, with allowable error of 12%, by using the formula $4pq/L^2$. The sample size was estimated to 218.

Schools in urban field practice area was enlisted and one of the school were randomly selected by Lottery method. The school authorities were met and explained about the purpose of the study. The class teachers were requested to instruct the students to obtain their parents consent to participate in the study. Pilot study was conducted to know about the feasibility of the study and to incorporate any changes required in the proforma for the study however, that data was not included in the main study.

The selected school had a strength of 220 students. Hence complete enumeration of the students was considered for this study. Data was collection by using semi-structured questionnaire by interview method. The study variables included were socio-demographic profile, menstrual history for female adolescents, history of passing worms in the stools, measurement of height, weight, estimation of hemoglobin percentage by Sahli's Hemoglobinometer and clinical examination.

Blood samples were taken by finger prick method using sterilized needles by a trained laboratory attendant. Hemoglobin was estimated by using Sahli's hemoglobinometer. Anemia was classified into three grades as per WHO criteria to mild, moderate and severe. The cut-off values for Mild anemia (10.0-11.9g/dl), for moderate anemia (7.0-9.9g/dl) and for severe anemia <7.0g/dl [5].

Measurement of Height: Height was recorded using a measuring tape applied to the wall. The measurements were taken with children barefoot with their back of heels, buttocks and head touching the wall. Readings were taken to the nearest 0.5cm.

Measurement of Weight: A portable standard weighing (bathroom) scale with an accuracy of 100gms was used. The children were made to stand with light clothing and without footwear, feet apart, looking straight. The measurements were taken to nearest 0.5kgs. The weighing machine were checked daily for any possible

error by comparing the results with a standard calibrated beam type of weighing machine available in our health centre. The weights were taken in kilograms.

Body Mass Index (BMI): BMI was calculated by using the formula weight in kilogram divided by height in meter square. Age of the child was considered in completed years as per the records maintained in the school.

Classification of the adolescents:

- Early adolescence: 10-14years
- Late adolescence: 15-19years

Study Instruments:

Semi-structured Questionnaire, portable weighing machine, measuring tape Sahli's Hemoglobinometer (German Company, Superior Marienfeld Lab Glassware, 3243000) and stethoscope were used during the study.

Ethical Consideration and Consent: Ethical clearance was obtained from the Institutional Ethical Committee. Prior permission was obtained from the concerned school authorities to conduct the study.

Data analysis: Data collected were entered in Micro-Soft Excel work sheet and analyzed using SPSS V 20. The qualitative data were expressed as percentages and the quantitative data with mean and standard deviation. Students 't' test and chi-square was applied to test the level of significance at $p < 0.05$.

Results

Out of 220 studied population, 131(59.5%) were males and 89(40.5%) were females adolescents. Majority of them belonged to class III socio economic status as per Modified KuppuSwamy's classification. The mean age (yrs) was 13.64 ± 1.573 ($t=125.36$, $p < 0.0001$), mean height (cm) was 146.90 ± 10.338 ($t =205.43$, $p < 0.0001$) and mean weight (Kgs) was 34.25 ± 8.404 ($t =58.92$, $p < 0.0001$). Prevalence of anemia in our study was 47.7% i.e.; (105 of 220) for both males and female adolescents. 61(58.1%) of the males and 44 (41.9%) of the female adolescents were anemic.

Among 105 anemic adolescents, 74(70.5%) of them were in late adolescent phase (15-19years) and 31(29.5%) in early adolescent phase (10-14 years). Anemia was observed among males (62.3%) and the females (81.8%) adolescents during their late adolescent phase (Table-1).

Table-1: Prevalence of anemia according to their age and gender (n=105)

| Age (years) | Male (%) | Female (%) | Total (%) |
|-------------|----------|------------|-----------|
| 10-14 | 23(37.7) | 08(18.2) | 31(29.5) |
| 15-19 | 38(62.3) | 36(81.8) | 74(70.5) |
| Total | 61(58.1) | 44 (41.9) | 105 (100) |

Majority of the adolescents were having moderate anemia (60%), mild anemia (38.1%) and severe anemia (01.9%). Out of 61 male adolescents, 33(54.1%) had moderate anemia and 28 (45.9%) had mild anemia. Severe anemia was not seen among the male adolescents. Among the 44 female adolescents, 30(68.2%) of them had moderate anemia, 12(27.3%) had mild anemia and only 02(04.5%) had severe anemia (Table-2).

Table-2: Distribution of anemic subjects as per WHO grading (n=105)

| Severity | Male (%) | Female (%) | Total (%) |
|----------|----------|------------|-----------|
| Mild | 28(45.9) | 12(27.3) | 40(38.1) |
| Moderate | 33(54.1) | 30(68.2) | 63(60.0) |
| Severe | - | 02(04.5) | 02(01.9) |
| Total | 61(100) | 44 (100) | 105 (100) |

Among 89 female adolescents, 67(75.3%) of them had attained menarche, out of which, 43(64.2%) had moderate anemia, 22(32.8%) had mild anemia and 02(02.9%) had severe anemia (Table-3).

Table-3: Attainment of menarche and anemia (n=89)

| Grading of anemia | Menarche attained (%) | Menarche not attained (%) | Total (%) |
|-------------------|-----------------------|---------------------------|-----------|
| Mild | 22 (32.8) | 11 (50.0) | 33(37.1) |
| Moderate | 43(64.2) | 08(36.4) | 51(57.3) |
| Severe | 02(02.9) | 03(13.6) | 05 (05.6) |
| Total | 67(75.3) | 22(24.7) | 89(100) |

X²=2.09, df=1 p<0.05

Among 67 female adolescents who had attained menarche, 46(68.7%) of them gave history of menorrhagia. Moderate anemia was observed in 27 (58.7%), mild anemia 11(23.9%) and severe anemia among 08 (17.4%) of the female adolescents (Table-4).

Table-4: Menorrhagia and anemia (n=67)

| Grading of anemia | Menorrhagia | | Total (%) |
|-------------------|-------------|----------|-----------|
| | Present | Absent | |
| Mild | 11(23.9) | 08(38.1) | 19(28.4) |
| Moderate | 27(58.7) | 11(52.4) | 38(56.7) |
| Severe | 08(17.4) | 02(09.5) | 10(14.9) |
| Total | 46(68.7) | 21(31.3) | 67 (100) |

X²=1.4, df =1, p<0.05

Among 50(47.6%) study subjects who were categorized as underweight, 29 (58%) of them had mild anemia, 21(42%) had moderate anemia. Among the 55(52.4%) study subjects with normal BMI, 20% of them had mild anemia and 76.4% with moderate anemia and 3.6% had severe anemia. The observed difference was statistically not significant (Table-5).

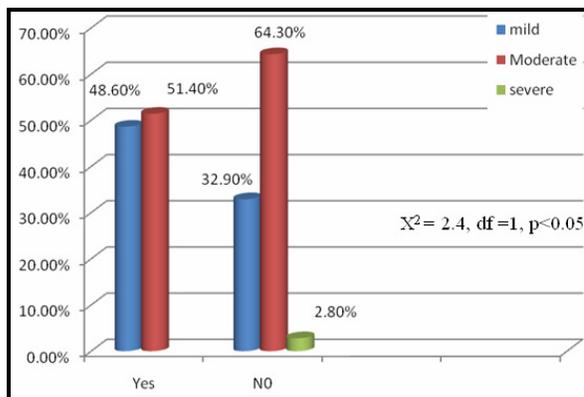
Table-5: Body Mass Index and anemia (n=105)

| BMI | Mild anemia (%) | Moderate anemia (%) | Severe anemia (%) | Total (%) |
|-------------|-----------------|---------------------|-------------------|-----------|
| Underweight | 29 (58) | 21 (42.0) | ---- | 50 (47.6) |
| Normal | 11 (20) | 42 (76.4) | 02 (3.6) | 55 (52.4) |
| Total | 40 (38.1) | 63 (60) | 02 (1.9) | 105 (100) |

X²= 16. 03 , df=1, P > 0.05

Out of 105 anemic subjects, 35(33.3%) of them gave history of passing worm in stools, where 17(48.6%) had Mild anemia, 18(51.4%) with Moderate anemia (Fig-1). 70(66.7%) had no history of passing worms in the stools, yet 23(32.9%) had mild anemia, 45(64.3%) had moderate anemia and 02(2.8%) had severe anemia. This difference could be because of the other conditions or factors which must be ruled out in these study subjects. The observed difference was found to be statistically significant.

Fig-1: Figure showing worm infestation among the anemic subjects (n=105)



Discussion

The present study was conducted to find out the prevalence of anemia among the adolescents in urban field practice area. Out of 220 study subjects 131 (59.5%) were adolescent male and 89(40.5%) were adolescent females. The prevalence of anemia in our study was 47.7% i.e.; (105 of 220) for both male and female adolescents. Priti Singh [6] et al in their study found 57.02% of girls and 42.98% boys had anemia, where as study conducted by Rana et al [7] showed prevalence of 60% of anemia in their study population.

In our study we found 74 (70.5%) were anemic in late adolescent period and 31 (29.9%) in early adolescent phase, among them around 81.8% were females which could be due to high menstrual loss, similar observations were done by Shilpa S [8] where anemic was high in late adolescent as compared to early adolescent phase. We found 60% suffered from mild anemia followed by 38.1% moderate and 1.9% suffered from severe anemia while study conducted by Sanjeev M Chaudary [9] showed 69.2% mild, 30.8% moderate anemia. Among the adolescent female in our study we found who had attained menarche around 64.2% had moderate anemia similarly Rajaratnam et al [2] in their study

found the prevalence of anemia was 40.7% in pre-menarcheal girls as compared to girls who had attained menarche (45.2%). Similar observations were done by Siddharam et al [10].

We found that 23.9% had mild anemia, 58.7% had moderate anemia while 17.4 % suffered from severe anemia , all these female adolescent gave history of menorrhagia similarly study done by S. Kaur [11] also showed that high menstrual blood loss is one of the determinants of Anemia (OR=12.29, CI=2.92-51.69). Among study population 33.3% gave history of worm infestation. Similar studies done by S. Kaur [11] and Mittal. M [12] reported 10.3% and 7.69 % of worm infestation.

Nutritional assessment of the study population was not included in our study which is one of the limitations of the study. Stool examination of the study subjects could have confirmed the worm infestation. This study have also included male adolescents, which could be the basis for more information on anemic status among them.

Conclusion

The prevalence of anemia in our study was 47.7%. Mild anemia was observed in 38.1%, Moderate anemia was 60% and severe anemia 1.9%.Age of onset of menarche, menorrhagia and worm infestation are the factors contributing to anemia. There is a need to reach this adolescent population through school approaches through nutrition education and distribution of iron and folic acid supplementation.

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