

# Impact of Anemia on Menstruation and Academic Performance of Adolescent Girls attending Secondary Schools of Rural Wardha District

<sup>1</sup>Rufina Binoy, <sup>2</sup>Neema Acharya

## ABSTRACT

**Introduction:** In this research, we hope to understand the effect of anemia on the various menstrual parameters and disorders and on the academic performance of adolescent girls attending secondary schools of rural Wardha.

**Materials and methods:** Questionnaires were prepared and distributed to the female students who came to attend the adolescent clinic in Acharya Vinoba Bhave Rural Hospital, Sawangi, India, for health checkup. Their hemoglobin was estimated and recorded in their respective questionnaires. Questionnaires were designed to understand in the best way possible the effects of anemia on the menstrual health and academic life of the adolescent girls.

**Results:** The results revealed a remarkable correlation between the grades of anemia and poor menstrual health; a similar result was seen in case of academic performance as well. It also threw light on the prevalence of anemia, which was recorded as 80% in this study, though most students had only mild grade anemia.

**Conclusion:** The results of the study revealed that there was a significant relation between anemia and the menstrual parameters and academic performance of the adolescent girls. This study could prove helpful for future researches which aim to provide better quality of life for adolescent girls in terms of general and menstrual health.

**Keywords:** Academics, Adolescent, Anemia, Menstruation, Rural.

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**Conflict of interest:** None

## INTRODUCTION

Anemia is a major health problem throughout the world. In India, the prevalence of anemia varies between 33 and 100%.<sup>1,2</sup> Anemia commonly affects young children,

adolescents, and women of childbearing age group.<sup>3</sup> Anemia is a common nutritional problem in adolescents.<sup>4</sup> Very few studies focus on adolescent girls' health, in view of that the present study was taken up to throw light on the prevalence of anemia in the rural district of Wardha and to assess the effect of the same on their menstrual health and academic performance.

## MATERIALS AND METHODS

- *Site:* The research was conducted in Acharya Vinoba Bhave Rural Hospital (AVBRH), Sawangi, Wardha, India.
- *Type of study:* Questionnaire-based study
- *Duration:* 6 months
- *Procedure:* A questionnaire was prepared to assess the menstrual history of the adolescent schoolgirls. The questionnaire was validated by Dr. Neema Acharya, Professor in the Department of Obstetrics and Gynaecology. Girls aged 10 to 19 years who came for the adolescent clinic to AVBRH from the schools in the region were made to answer the questionnaire based on the menstrual disorders faced by them in the past year and as a part of the general health checkup; their hemoglobin was measured and their scores in the last main exam were recorded. The hemoglobin levels of the girls were classified into mild (10–11.9 gm%), moderate (7–9.9 gm%), and normal (>12 gm%) (based on World Health Organization data) and their answers were tabulated accordingly.
- *Statistics:* A total number of 250 girls participated in the study. Percentage-wise analysis of their answers was done, following which the p value was found and the significance was assessed.

## RESULTS

Out of 250 girls who participated in the research, 12% of them had moderate grade anemia, i.e., 7 to 9 gm%, 68% of them had mild grade of anemia, i.e., 10 to 12 gm%, and 20% had normal hemoglobin level (Table 1). In Table 2, we see the effect of the grades of anemia on the duration of flow. Table 3 shows the correlation between grades of anemia and its effect on certain select menstrual disorders. In Table 4, we have depicted the effect of the grades of anemia on the

<sup>1</sup>Professor, <sup>2</sup>Intern

<sup>1,2</sup>Department of Obstetrics and Gynaecology, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India

**Corresponding Author:** Neema Acharya, Intern, Department of Obstetrics and Gynaecology, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India, e-mail: neemasacharya@gmail.com

**Table 1:** Distribution of adolescent girls according to grades of anemia

Grades of anemia (Hb gm%)	Number of people (N)	Percentage
Moderate (7–9.9)	30	12
Mild (10–11.9)	170	68
Normal (>12)	50	20

academic performance of the girls, based on the percentage scored by them in the last major examination.

## DISCUSSION

The importance of research on the health of adolescent girls cannot be underemphasized. Iron deficiency anemia is a common condition among women in India.<sup>5,6</sup> Preventing anemia at a young age can prove beneficial for the health and development of the girl. Adolescence is also considered a “preparatory period” to ensure healthy reproductive life of the girl.<sup>7</sup>

In our study, as shown in Table 1 and Graph 1, prevalence of anemia among the adolescent girls is 80%; this figure is higher than the results of another similar research conducted in India by Kakkar et al,<sup>3</sup> where the prevalence was comparatively low at 58.4%. Similar figures were seen in another research by Jawarkar et al<sup>8</sup> too. This variation in the prevalence of anemia seen in between the two studies conducted in places closely situated can be attributed to the fact that our research was conducted among rural population. Among those assessed, 68% had mild grade anemia, while 12% had moderate grade anemia. On comparison with the study conducted by Kakkar et al,<sup>3</sup> we see that the prevalence of mild grade anemia in their study is 48.5%, which is less than our result for the same. A very similar observation was made in the study conducted by Jawarkar et al<sup>8</sup> too. In our study, the number of students with severe anemia was recorded as zero, while in the study conducted by Kakkar et al,<sup>3</sup> an

**Table 2:** Anemia and abnormal menstrual cycles

Grades of anemia (Hb gm%)	Normal flow	Polymenorrhea	Menorrhagia	Hypomenorrhea	Oligomenorrhea
Moderate (7–9.9)	10	4	7	3	6
Mild (10–11.9)	78	35	14	25	18
Normal (>12)	13	5	16	15	4

**Table 3:** Anemia with normal menstrual cycles and associated disorders

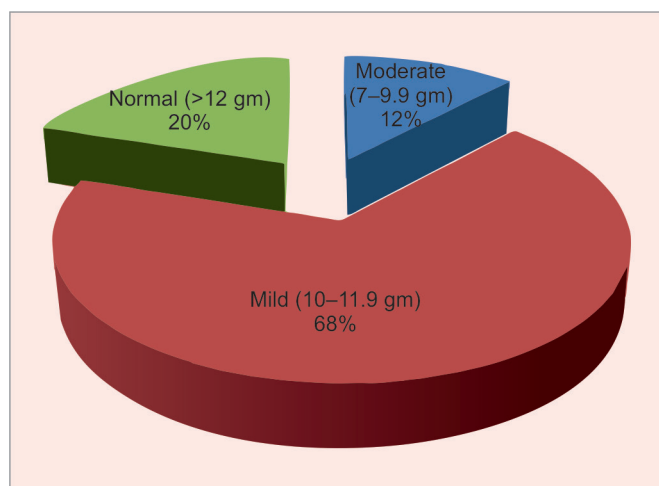
Menstrual parameters	Hemoglobin (gm%)			p-value
	Normal (>12 gm%) N = 50	Mild (10–11.9 gm%) N = 170	Moderate (7–9.9 gm%) N = 30	
Age at menarche (years)				50.50 p = 0.0001, S
10	1 (2%)	5 (2.9%)	5 (16.6%)	
11	4 (8%)	9 (5.2%)	3 (10%)	
12	7 (14%)	21 (12.3%)	4 (13.3%)	
13	16 (32%)	66 (38.8%)	9 (30%)	
14	19 (38%)	47 (27.6%)	3 (10%)	
15	2 (4%)	12 (7.0%)	5 (16.6%)	
> 15	1 (2%)	10 (5.8%)	1 (3.3%)	
(250)	(50)	(170)	(30)	
Dysmenorrhea				17.32 p=0.0002, S, p < 0.056
Present	37	159	23	
Absent	13	11	7	
(250)	(50)	(170)	(30)	
Premenstrual syndrome				9.83 p=0.003, S, p < 0.05
Present	43	111	17	
Absent	7	59	13	
(250)	(50)	(170)	(30)	

$\chi^2$ -value=31.44, p-value=0.0001, S: Significant

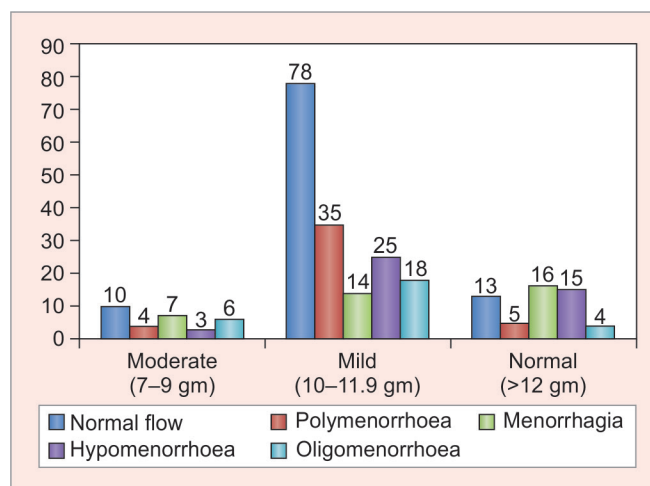
**Table 4:** Effect of anemia on academic performance

Grades of anemia	Marks scored in the last qualifying exam (%)				
	>70%	60–70%	50–60%	40–50%	<40%
Normal (>12 gm%) N=50	21 (42%)	9 (18%)	8 (16%)	2 (4%)	0
Mild (10–11.9 gm%) N=170	52 (30.5%)	64 (37.6%)	34 (20%)	19 (11.1%)	1 (0.5%)
Moderate (7–9.9 gm%) N=30	8 (26.6%)	9 (30%)	6 (20%)	5 (16.6%)	2 (6.6%)

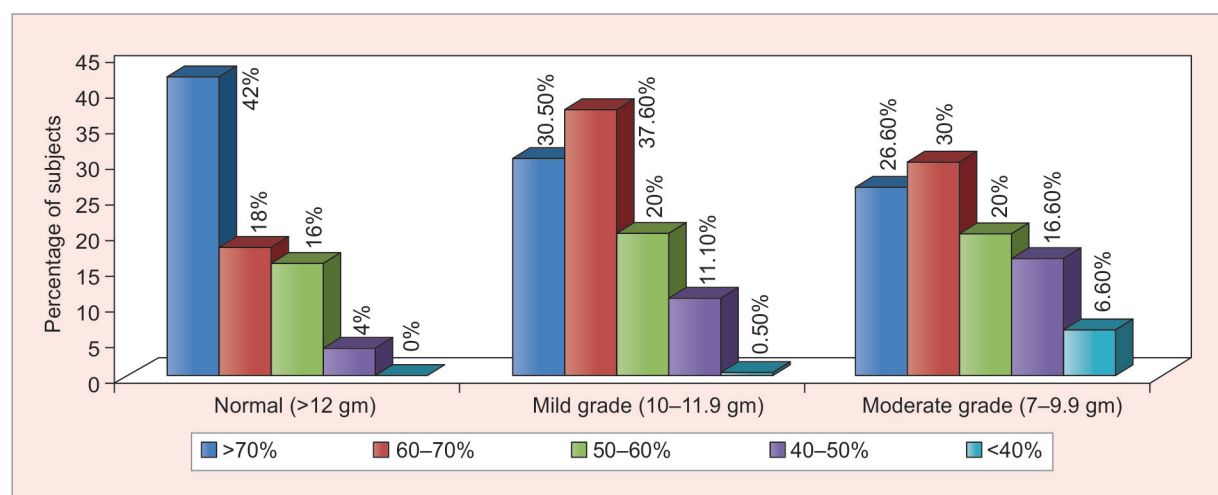
$\chi^2$ -value=17.82, p-value=0.0226, Significant



**Graph 1:** Distribution of adolescent girls according to grades of anemia



**Graph 2:** Anemia and abnormal menstrual cycles



**Graph 3:** Anemia with normal menstrual cycles and associated disorders

almost similar figure of 0.4% was seen. A good number of adolescents with mild anemia can be positive as it can be rectified easily and fully, preventing complications, while the negative aspect would be that many such cases remain undiagnosed mainly due to less severe symptoms.

On studying the association between anemia and menstrual flow patterns as seen in Table 2 and Graph 2, the results show significant association with anemia. This was unlike the results of the study conducted by Rupali and Sanjay,<sup>9</sup> which showed no significant association between anemia and menstrual flow patterns. Whereas in the study conducted by Panat,<sup>10</sup> it was seen that girls with anemia had significantly longer cycle length (>7 days). There was also a significant effect of anemia on the age of menarche, as seen in Table 3 and Graph 3, most girls with mild anemia attained menarche at the age of 13 to 14 years, which was similar to the results of the study conducted by Kakkar et al.<sup>3</sup> A significant association was seen between anemia and the menstrual disorders like dysmenorrhoea and premenstrual syndrome, total

number of cases with dysmenorrhoea were 119 of which a significantly high number of students (159) fell under the category of mild grade anemia while the total number of cases with premenstrual syndrome were 117 and a significantly high number (111) students fell under the category of mild anemia, suggesting an association between these symptoms and presence of mild anemia. These findings were similar to the findings in the studies conducted by Rupali and Sanjay,<sup>9</sup> and Chavada et al.<sup>11</sup>

On assessing the effect of anemia on academic performance in Table 4, although no significant relation was seen between the scores of the students and their hemoglobin levels, there seems to be a markedly reduced number of students scoring higher marks in the moderate anemia group as compared with the students with mild anemia. A similar observation was seen in the study conducted by More et al,<sup>12</sup> which showed a significant low score in mathematics in anemic group of students. In the research conducted by Soemantri et al,<sup>13</sup> in the United States, a similar, significant fall in scholastic achievements was recorded.

Though there was a significant relation between anemia and the parameters, there were limitations to this study. The family history of the adolescent girls could not be assessed due to time constraints and their academic performance was only assessed based on their last main exam results due to lack of records, which could be misleading.

## CONCLUSION AND RECOMMENDATIONS

In our study, the prevalence of anemia among adolescent girls was high at 80%, though mostly mild anemia; it can be rectified if interventions are prompt. There was also a significant association between mild anemia and most parameters; therefore, awareness about the condition and prompt necessary interventions can play a vital role in coping with its effects. This study could prove helpful in future researches aimed toward finding cure for these disorders and in improving the quality of life of adolescent girls, especially in terms of their menstrual health.

Adolescence is also an important period in the reproductive life of the woman; therefore, adolescent girls should be counseled regularly through health awareness programs held at the school level to bring forth discomforts related to their menstrual health to professional attention. Bringing such issues to professional attention can prove helpful in improving their performance academically and ensuring good health and standard of living as adults too.

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