

## Changes in hemoglobin level in Bengali women in menstrual cycle of India

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**Abstract:** Menstruation is the most striking event in the process of female puberty, which in turn is a part of adolescence. Studies have shown that approximately 10% of women lose more than 1.4 mg of iron per day through menstrual bleeding (Li et al, 2011). 71 adolescent girls were part of this study. Hemoglobin level was obtained by using standard method (Sahli's haemoglobinometer; acid haematin method). The data was subjected to statistical analysis. Mean hemoglobin (Hb) level of on menstruation ( $10.92 \pm 1.18$  (mg/dl) is significantly lower than after menstruation. The blood loss during menstruation results in a negative iron load in women and increases the risk for developing iron-deficiency anemia (Silotry, 2011).

**Key words:** Hemoglobin, Menstrual cycle, Bengali population.

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### I. Introduction:

Menarche indicates the specific stage of first periodical regular flow of blood from uterus in all healthy females (Biswas, 2004). It is the most striking event in the process of female puberty, which in turn is a part of adolescence. During this cycle, secretion of steroid hormones namely, estrogen and progesterone occur (Hall). Studies have shown that approximately 10% of women lose more than 1.4 mg of iron per day through menstrual bleeding (Li et al, 2011) and also estimated the average menstrual blood loss by weighing menstrual pads before and after use by their subjects (mean (SD), 59.3 [25.1] g/dL). The total amount of blood loss during menstruation ranges from 30 to 180 ml, with an average of 80 ml per menstrual period (Hellbarg et al, 1966). Also, it has been shown that blood loss of 40 ml during menstruation yields an average loss of 1.6 mg of iron (Hallberg et al, 1966). Iron deficiency affects approximately 20% to 25% of the world's population, predominantly children and women (Andrade et al, 1991). It has been demonstrated that iron deficiency is more likely in women of reproductive age because of menstrual blood loss.

**Objective:** The objective of the present study is to find out the level of hemoglobin in different stages of menstrual cycle.

### II. Materials and Methods:

71 adolescents participant were part of this study. The hemoglobin levels were estimated during the menstrual cycle (on the 2nd day of menstrual cycle and after 7 days of the completion of the menstrual cycle) by using standard protocol (Sahli's haemoglobinometer; acid haematin method). Pretested questioner used for obtaining the lifestyle variables and age at menarche, duration of menstruation period with amount of menstrual blood loss has been collected by self-reported method. Necessary statistics have been used for the present study. Cut of value was set as  $p \leq 0.05$ .

### III. Results:

Mean hemoglobin (Hb) level of on menstruation is  $10.92 \pm 1.18$  (mg/dl) and after menstruation is  $11.48 \pm 0.89$  (mg/dl) which indicated significantly ( $p < 0.05$ ) lower Hb level on menstruation cycle in comparison to the cessation of menstruation (Table 1).

**Table 1 Mean and SD of on menstruation Hb level and after menstruation Hb level**

No. of Participants	Hemoglobin level on menstruation	Hemoglobin level after menstruation
71	$10.92 \pm 1.18^*$	$11.48 \pm 0.89^*$

\* $p < 0.05$

Therefore, Hb level obtained from on menstruation is significantly lower than after menstruation Hb level. Hb level on menstruation and duration of discharge had significant ( $p < 0.05$ ) negative correlation (Table 2). It means duration of menstrual length had a significant effect on menstruation Hb level. Table 3 revealed that the girls who experienced self-reported heavy discharge have lower level of on menstruation hemoglobin than the girls who experienced moderate or low discharge.

**Table 2 Correlation of on menstruation Hb level and duration of bleeding discharge**

Hemoglobin level	Duration of discharge (in day)
On menstruation	-.0482*

\* $p < 0.05$

**Table 3 Association between types of discharge and on menstruation hemoglobin level**

Type of discharge	N	Percent	On menstruation hemoglobin level Mean $\pm$ SD (mg/dl)
Heavy discharge	27	38.02	10.16 $\pm$ 1.23
Moderate or scanty discharge	44	61.98	11.39 $\pm$ 0.87

#### IV. Discussion:

There is two phase of menstrual cycle pre-ovulatory or follicular phase and post- ovulatory or luteal phase. During the follicular phase, the estrogen concentration is higher while during the luteal phase, progesterone surge occurs. The hemoglobin level is higher in after menstruation period. A study demonstrated statistically significant variation occurs in the levels of hemoglobin between the follicular and luteal phases of menstrual, hemoglobin levels obtained were higher during the luteal phase. This could be due to the loss of blood during the menstruation cycle (Kotwaneyet *al.*, 2014). The present study also shows that hemoglobin levels of on menstruation and after menstruation differ significantly and found in corroboration with earlier reports.

On menstruation hemoglobin, level shows significant negative correlation with the duration of blood discharge. The mean hemoglobin level of the girls who experienced moderate or scanty discharge (self-reported) is higher than the girls who experienced heavy discharge. The blood loss during menstruation results in a negative iron load in women and increases the risk for developing iron-deficiency anemia (Silotry, 2011).

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