# ASSOCIATION BETWEEN MENSTRUAL BLOOD LOSS BEFORE PREGNANCY AND MICROCYTIC HYPOCHROMIC ANEMIA DURING PREGNANCY AMONG CURRENTLY PREGNANT WOMEN IN ANURADHAPURA DISTRICT

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**Key words:** Menorrhagia, Microcytic hypochromic anemia ,Pregnant women

## INTRODUCTION

Anemia in pregnancy remains as one of the major health problems in the developing world. Annually, more than 80 million women around the globe go through pregnancy with low hemoglobin levels. In Asia, prevalence of anemia among pregnant women is estimated to be 41.6% (Benoist, McLean et al. 2008). The latest demographic and health survey, Sri Lanka estimates that 34% of the pregnant women in Sri Lanka are suffering from anemia during pregnancy(Department of Census and Statistics Sri Lanka 2009). Pregnant women with severe anemia carries a 3.5 times higher risk of death during pregnancy compared to non-anemic women and severe anemia stands among the top ten causes of morbidity of pregnant women (Brabin, Hakimi et al. 2001).

Iron deficiency is the primary cause of anemia throughout the world. Complex interrelating factors and underlying causes are contributing to_iron deficiency anemia especially in developing countries. Though iron deficiency is mostly associated with inadequate dietary intake of iron rich food, among females, inadequate intake is often confounded by menstrual blood loss. Excessive menstrual blood loss (menorrhagia) and other menstrual problems are often considered as one of the leading causes for iron deficiency anemia during pregnancy (Benoist, McLean et al. 2008). Data on the relationship between menstrual blood loss and anemia in pregnancy is scarce in Sri Lanka. The objective of the present study was to describe the association between the menstrual blood and anemia among pregnant women in Anuradhapura district.

## METHODS

A cross sectional descriptive study was carried out in Anuradhapura district from November 2010 to May 2011. The study population included all currently pregnant women residing in Anuradhapura district. Study participants were selected using a two stage cluster sampling technique with probability proportionate to size. Five medical officer of health areas were selected in the first stage and modified WHO 30 cluster sampling with increased precision was used to place clusters in antenatal clinics in the study area. All pregnant women participating in antenatal clinics were invited for the study. Data collection was carried out using a pre-tested interviewer administered questionnaire. Data on menarche, duration and frequency of menstrual blood flow and menstrual disorders (within the period of menstrual cycle being regularized after menarche and before commencement of hormonal contraceptives) were collected using fully structured questions. Menstrual flow was estimated using menstrual pictogram (Higham, O'Brien et al. 1990). Microcytic (mean corpuscular volume<76 fL)-hyphocromic(mean corpuscular heamoglobin<32 g/dL) anemia was used as a proxy measure of iron deficiency anemia in this study population. Data collection guidelines and protocols were developed and only female interviewers collected data related to menstrual bleeding. Data collectors were MBBS graduates or fourth year medical undergraduates supervised by MBBS graduates. Blood samples for hemoglobin measurements were obtained by a trained medical laboratory technician in the field. Venous blood samples were transported and analyzed the same day. Automated blood analysis was used for hemoglobin measurement and for analysis of red cell indices. Estimated mean menstrual blood loss was compared among anemic and non-anemic pregnant women. Ethical clearance for the study was obtained from Ethical Review Committee of Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka.

## RESULTS AND DISCUSSION

Study sample included 539 pregnant women from 39 public health midwife areas. Mean age of the study sample was 27 years (standard deviation 5 years). Ethnic composition of the study sample was; Sinhalese 86.8% (n=468); Moor 12.1%(n=65) and Tamil 1.1%(n=6). Of the 539 study participants, 135 (25.1%) completed post primary education, 117 (21.7%) had completed secondary education whereas the majority of the sample completed only primary education.

Of the 539 pregnant women studied 86 (16%) had Hb value less than 11mg/dl. Prevalence of severe (Hb<7mg/dl), moderate (Hb 7-9.9 mg/dl) and mild (Hb 10-

10.9mg/dl) anemia was .2%, 3.9% and 11.9% respectively. Of the 86 pregnant women with anemia, 15 (17.4%) had microcytic hypocromic anemia. Average values for Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), and Mean Corpuscular Hemoglobin Concentrating among anemic mothers were, 82.9 fL(SD 11.5), 27.6 (SD-3.6)pg/cell and 32.9g/dL (SD 1.8) respectively.

The duration of menstrual bleeding was ranging from 2-9 days with a median of 5 days per cycle. Mean blood loss for a menstrual cycle in the study sample was 68.9 mL (standard deviation-38mL) per cycle (Figure 1). Menorrhagia (average blood loss>80ml per cycle) was reported by 139 (31.4%) pregnant women.

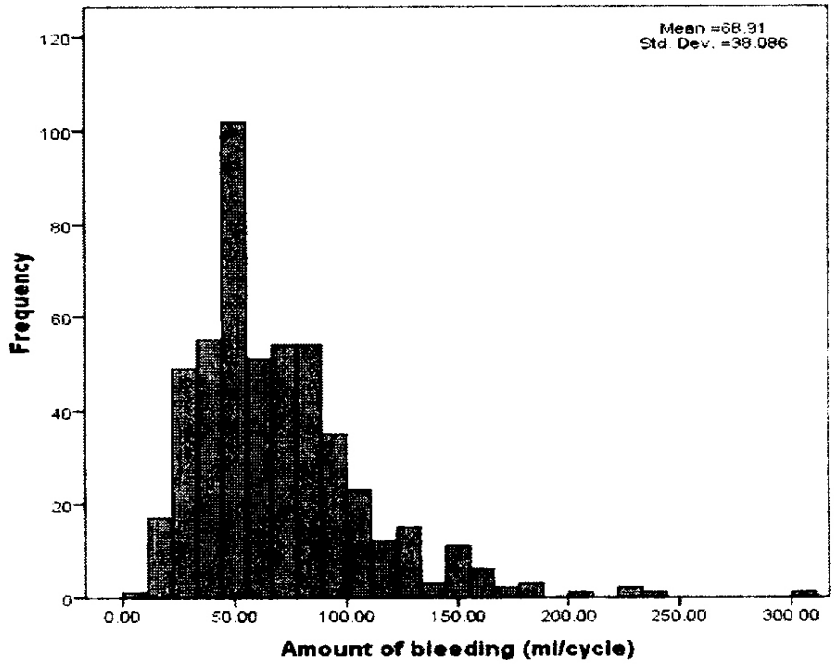


**Figure 1- Distribution of estimated average menstrual bleeding per cycle**

**Table 1: Distribution of menstrual blood loss by anemic status**

| Anemic status | Menstrual blood loss | |
|---|---|---|
| | Mean | SD |
| Anemic | | |
| Microcytic- Hypochromic | 86.96 | 55.73 |
| Normocytic- Normocromic | 63.92 | 46.64 |
| Non-anemic | 68.88 | 36.28 |

Even though the mean menstrual blood flow among pregnant women with probable iron deficiency anemia was 87mL (SE 14.9mL) compared to 64mL (SE 6.7mL) among pregnant women with normocytic-normochromic anemia, the observed difference was not statistically significant (ANOVA, F=.016, p=.899).

The estimated prevalence of anemia in Anuradhapura district according to this study was less than 50% of the reported national prevalence. Probable iron deficiency anemia among pregnant women was also reported as only 17.4%. Although we hypothesized that menstrual bleeding would be associated with iron deficiency anemia, this preliminary analysis did not show supportive evidence for our hypothesis. However, this study finding has limitations due to several facts. Firstly, we used a proxy measure for iron deficiency anemia. Secondly, in this analysis we did not included the other major determinants such as dietary intake, hematological disorders, chronic diseases and confounders such as age, parity, period of amenorrhea. Recall bias could also have an effect on this finding. Despite the fact that menstrual bleeding was not associated with anemia in this study population, excessive menstrual bleeding which can lead to anemia in pregnancy was shown to be high (31.4%) in this group of pregnant women.

## CONCLUSIONS

Prevalence of mennorhagia was high among this study population, though the present study failed to demonstrate association between menstrual bleeding and iron deficiency anemia among pregnant mothers in Anuradhapura district. Further studies are needed to examine this observation in-depth.


## ACKNOWLEDGMENT

This study was funded by Maternal Health Task Force of EngenderHealth.