

Hallberg L & Nilsson L. Determination of menstrual blood loss. *Scand. J. Clin. Lab. Invest.* 16:244-8, 1964.

[Departments of Medicine II and Obstetrics and Gynecology, University of Göteborg, Sweden]

A simple and reliable method was described to measure menstrual blood loss. The simultaneous use of tampons and towels greatly facilitated a quantitative collection of menstrual blood. The loss was measured by extracting the tampons and towels for 20 hours using a sodium hydroxide solution to convert all heme chromogens to alkaline hematin, which was determined spectrophotometrically. [The SCI® indicates that this paper has been cited in over 150 publications.]

## Iron Requirements and Menstruation

Leif Hallberg  
Department of Medicine II  
and  
Lennart Nilsson  
Department of Obstetrics  
and Gynecology  
University of Göteborg  
Sahlgren Hospital  
S-413 45 Göteborg  
Sweden

October 21, 1988

This method was developed in 1961 as a result of increased awareness of the difficulty of estimating menstrual blood loss from medical history. In clinical practice, both in gynecology and in internal medicine, in the latter case to clarify the cause of iron deficiency, there is a need to obtain information concerning the magnitude of menstrual blood loss. No simple and reliable method that could be used in clinical practice was available at that time. What made this method particularly useful both in clinical practice and in basic research was the quite unexpected observation that menstrual blood loss was almost constant for each

woman but varied markedly between different women.<sup>1</sup> This implied that a single measurement in a woman provided information about her average menstrual blood loss and her average iron requirements.<sup>2</sup> Moreover, the method became a necessary instrument when studying the effect of different contraceptive methods on menstrual blood loss. Contraceptive pills as a rule reduce losses by half, whereas intrauterine devices were found to double losses. The method was also used in studies on the effect of various treatments on excessive menstrual bleeding.

As expected, we found a poor correlation between the patients' opinion of the magnitude of the menstrual loss and the actual losses measured. The knowledge that information concerning the losses obtained from an ordinary medical history had a low reliability implied that there was a need for a simple and reliable method in clinical practice.

As mentioned in a previous *Citation Classic*,<sup>2</sup> the constancy of menstrual blood loss in each woman made it possible, using this method with a random sample of women, to calculate the variation in iron requirements in women and to understand why some women have a tendency to develop iron deficiency. The fact that the magnitude of the losses are to a large extent genetically controlled<sup>3</sup> and that the average losses and their variation are almost the same for women in Sweden, England, Canada, Egypt, Burma, and China has allowed calculations of the probability of iron deficiency developing in different populations with different nutritional statuses. The present method has thus proved to be important both in clinical practice and in public health.

[Editor's note: Reference to a recent review article that cites Hallberg and Nilsson's work is provided.<sup>4</sup>]

1. Hallberg L & Nilsson L. Constancy of individual menstrual blood loss. *Acta Obstet. Gynecol. Scand.* 43:352-9, 1964. (Cited 40 times.)
2. Hallberg L, Höglund A-M, Nilsson L & Rybo G. Menstrual blood loss—a population study. Variation at different ages and attempts to define normality. *Acta Obstet. Gynecol. Scand.* 45:320-51, 1966. (Cited 150 times.) [See also: Hallberg L & Rybo G. *Citation Classic. Current Contents/Clinical Practice* 14(44):22, 3 November 1986.]
3. Rybo G & Hallberg L. Influence of heredity and environment on normal menstrual blood loss: a study of twins. *Acta Obstet. Gynecol. Scand.* 45:389-410, 1966. (Cited 5 times.)
4. Belsey E M & Farley T M M. The analysis of menstrual bleeding patterns: a review. *Appl. Stochastic Models Data Anal.* 3:125-50, 1987.

JA-14

CC/LB