

# HEMATOCRIT AND MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION IN NORMAL ADULT FILIPINO STUDENTS\*

MANUEL P. MACAPINLAC, M.D., AMELIA M. ALBINO, M.D.  
and SOLITA F. CAMARA-BESA, M.D., M.S. (Biochem.)

*Department of Biochemistry, College of Medicine  
University of the Philippines*

In a previous paper, Camara-Besa and Macapinlac (1) presented hematocrit values of normal Filipino students obtained by the copper sulfate specific gravity method. Macapinlac, *et al.* (2) showed that the hematocrit values of normal subjects obtained by this method were comparable with those obtained by the method of Wintrobe (3), but emphasized that the former method was found by Van Slyke, *et al.* (4) to give accurate values for pathologic samples. For clinical purposes, therefore, the utility of the copper sulfate specific gravity method of hematocrit determination becomes limited. The method of Wintrobe has not only been accepted as a reference method but is probably still the one most commonly used in many clinical laboratories. To provide better values that can be considered normal for Filipinos, determination of hematocrit was extended in the present study to include a larger number of subjects using the standard method of Wintrobe. It was deemed worthwhile also to determine the mean corpuscular hemoglobin concentration since this value as stressed by Wintrobe (5), is important in the study of anemias.

## EXPERIMENTAL METHODS

The subjects were 155 medicine, nursing, dentistry, and B.S. Hygiene students, considered normal following the criteria previously used; to wit,

1. Absence of signs and symptoms of disease.

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\* This study was supported in part by a grant-in-aid from the U.P. Natural Science Research Center.

2. Normal blood pressure, not over 135/85 mm. Hg.
3. Normal urine findings by routine examination.
4. In the presence of gingivitis, subjects with vitamin C blood levels below 0.4 mg. per 100 ml. were excluded.

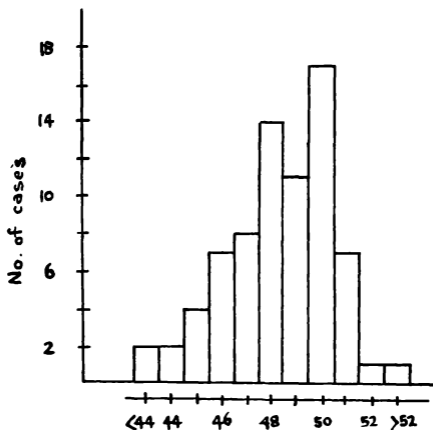
The subjects consisted of 74 males, aged 18 to 30 years with a mean of 20.1 years, and 81 females, aged 18 to 26 years with a mean of 19.7 years.

The blood samples were obtained by venipuncture and prevented from coagulating by delivery into test tubes previously lined with dried heparin (0.2 mg. heparin per ml. of blood). Hematocrit values were determined shortly after blood withdrawal. Standard Wintrobe tubes were filled to the mark, and the volume of packed RBC per 100 ml. of blood was determined after centrifuging the tubes for one hour in a No. 2 International Centrifuge at 3,000 rpm, following the procedure recommended by Wintrobe (3). An aliquot of the heparinized blood samples, in 35 males and 31 females, was analyzed for hemoglobin concentration, following the iron method of Wong as modified by Ponder (7). The mean corpuscular hemoglobin concentration (M.C.H.C.) was calculated from the obtained hemoglobin and hematocrit values, using the following equation:

$$\text{M.C.H.C.} = \frac{\text{Hemoglobin, grams per 100 ml.}}{\text{Vol. packed RBC per 100 ml.}} \times 100$$

## RESULTS

The mean hematocrit values obtained were  $46.97 \pm 2.79$  (S.D.) volume per cent (cells) for males, and  $41.59 \pm 2.82$  (S.D.) volume per cent (cells) for females. Figures 1 and 2 show the frequency distribution of the values obtained.



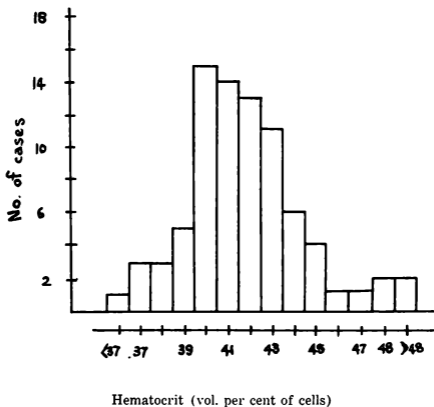
Hematocrit (vol. per cent of cells)

Mean = 46.97

S.D. = 2.97

Actual Range = 35.0 — 51.0

Figure 1. Hematocrit values in normal adult male Filipino students.



Mean = 41.59  
 S.D. = 2.82  
 Actual Range = 34.0 — 52.0

Figure 2. Hematocrit values in normal adult female Filipino Students.

The mean corpuscular hemoglobin concentration obtained for males was  $33.57 \pm 1.81$  per cent (S.D.), and those for females was  $32.68 \pm 2.24$  per cent (S.D.). The difference in the mean corpuscular hemoglobin concentrations obtained (0.89 per cent) in the two groups is not statistically significant ( $t = 1.7$ ).

Table 1 presents the hematocrit and mean corpuscular hemoglobin concentration obtained in our subjects and those obtained by Wintrobe (7) from a compilation of previously reported values for adult subjects.

COMPARISON OF HEMATOCRIT AND MEAN CORPUSCULAR CONCENTRATION IN THIS STUDY WITH VALUES REPORTED IN THE LITERATURE

SEX	Vol. Packed RBC (ml. per 100 ml. Blood)		Mean Corpuscular Hemoglobin Concentration (%)	
	Filipinos This Series	Wintrobe's Series <sup>1</sup>	Filipinos This Series	Wintrobe's Series <sup>1</sup>
Males	46.97 $\pm$ 2.79	47.0 $\pm$ 7.0	33.57 $\pm$ 1.81	34 $\pm$ 2.0
Females	41.59 $\pm$ 2.82	42.0 $\pm$ 5.0	32.68 $\pm$ 2.24	34 $\pm$ 2.0

<sup>1</sup> Wintrobe, M. M. (6)

Note: All figures given are means  $\pm$  standard deviation.

In both male and female subjects in the present study, the hematocrit values agree very well with those given by Wintrobe. Stransky and Aragon (8) obtained a lower mean hematocrit value (37.2 vol. per cent cells), in a study of 130 non-pregnant Filipino women. The mean corpuscular hemoglobin concentration of our subjects are only slightly lower than those given by Wintrobe.

### SUMMARY

In 74 male Filipino students from 18 to 30, averaging 20.1 years old, judged clinically healthy by criteria set forth in the text, the mean hematocrit value was 46.97  $\pm$  2.79 (S.D.) volume per cent cells and the mean hemoglobin concentration in 35 of the subjects was 33.57  $\pm$  1.81 (S.D.) per cent.

Selected under the same set of criteria as normals, 81 female Filipino students from 18 to 26, averaging 19.7 years old gave a mean hematocrit value of 41.59  $\pm$  2.82 (S.D.) volume per cent cells, and 31 of them had a mean corpuscular hemoglobin concentration of 32.68  $\pm$  2.24 (S.D.) per cent.

As expected, the male subjects had higher hematocrit values than the females. On the other hand, the mean corpuscular hemoglobin concentration did not show any significant sex difference.

#### ACKNOWLEDGMENT

The authors are grateful to the members of Class 1962 of the College of Medicine, Class 1962 of the College of Dentistry and B.S. Hygiene and to Class 1963 of the School of Nursing for their cooperation as subjects in this study.

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