

HAEMOGLOBIN LEVELS IN MALTESE WOMEN OF CHILDBEARING AGE

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This paper reports the results of haemoglobin studies carried out on 1008 menstruating females between the ages of 15 and 49. The sample was made up of 676 healthy married parous women who were taking their children to the child welfare clinics of a government hospital (601 mothers) and of a private hospital (75 mothers). All pregnant and lactating mothers were excluded. Haemoglobin estimations were also carried out on 332 unmarried nurses working at the two hospitals. The survey was carried out between January 1966 and July 1966.

Method

Haemoglobin levels were estimated in g. haemoglobin per 100 ml. blood as cyanmethaemoglobin (Dacie and Lewis, 1963) in an E.E.L. photo-electric colorimeter (Ilford filter 625) and are stated here as g. haemoglobin. Comparisons between different techniques of haemoglobin estimation by Elwood and Jacobs (1966) showed that the E.E.L. colorimeter gave the more consistent results. One observer took all the specimens and made all the estimations. Though Leverton and Roberts (1936) suggested that there appeared to

be no constant measurable effect of the process of menstruation on the daily values of either haemoglobin or red cells, it was decided that no blood samples would be taken during menstruation. The blood was taken at least one week after the cessation of menstruation, all the samples being taken in the morning.

Results

The haemoglobin levels were grouped according to the age parity and social class. The mothers attending the private hospital on the whole enjoyed a better economic and social status than those visiting the government hospital. The haemoglobin levels of the married parous and unmarried females were also compared.

The mean haemoglobin level in the whole married series was 13.6 g. and in the unmarried group it was 13.7 g., being 13.6 g. in the whole series.

Table I shows the effect of age on haemoglobin levels in both married and unmarried women. In the married group, 96% had a haemoglobin value between 10.0 and 16.0 g. and 91% between 11.0 and 15.0 g. Seven cases had a haemoglobin level

below 10.0 g. and 13 had a haemoglobin level between 10.0 and 11.0 g. In the unmarried group, there was only one case with a haemoglobin level less than 10.0 g. and 5 between 10.0 and 11.0 g. haemoglobin.

The effect of parity on the haemoglobin levels in married women attending the government and private hospitals is shown in *Table II*. There was not much difference in the haemoglobin levels of women attending the two hospitals who had the

TABLE I
Variation of Hb. Levels with Age in Married and Unmarried Females

Age	No.	Unmarried Females			No.	Married Females		
		Hb. (g./100 ml. Blood)				Hb. (g./100 ml. Blood)		
		Range	Mean	S.D.		Range	Mean	S.D.
15-19	96	7.3-17.1	12.83	1.28	7	12.7-16.4	14.33	1.29
20-24	123	10.6-16.6	14.00	1.20	110	9.4-15.8	13.45	1.21
25-29	57	10.7-15.7	13.42	1.08	194	9.8-16.8	13.63	1.17
30-34	35	11.3-15.9	13.55	1.50	205	9.6-15.9	13.35	1.28
35-39	16	12.0-15.5	13.55	1.30	81	10.1-16.8	13.10	1.36
40-44	3	12.7-13.7	13.23	0.56	61	8.6-15.7	12.65	1.43
45-49	2	13.4-16.6	15.00	2.26	18	12.2-14.8	13.25	0.68
15-49	332		13.7		676		13.6	

TABLE II
Effect of Parity on Hb. Levels

No. of Pregnancies	No. at Govt. Hosp.	Haemoglobin g./100 ml. Blood		No. at Pte. Hosp.	Haemoglobin g./100 ml. Blood	
		Mean	S.D.		Mean	S.D.
1	121	13.64	1.32	39	13.75	1.10
2	125	13.42	1.14	23	13.60	1.47
3	97	13.54	1.10	9	13.36	0.72
4	76	13.34	1.11	4	13.70	1.69
5	52	13.47	1.31			
6	48	12.86	1.26			
7+	82	12.92	1.48			

TABLE III
Effect of Age and Parity on Hb. Levels
(No. of women given in parenthesis)

Parity	Age						
	1	2	3	4	5	6	7+
15-19	14.3 (4)	14.3 (3)					
20-24	13.7 (72)	13.4 (27)	13.7 (8)	13.4 (2)		9.4 (1)	
25-29	13.8 (51)	13.5 (70)	13.7 (37)	13.7 (18)	13.5 (10)	13.5 (5)	13.4 (3)
30-34	13.3 (27)	13.5 (37)	13.5 (47)	13.3 (41)	13.4 (26)	13.2 (14)	13.5 (13)
35-39	13.6 (4)	13.4 (7)	12.9 (7)	13.4 (10)	13.2 (10)	13.2 (15)	12.8 (28)
40-44	13.1 (2)	13.7 (3)	13.2 (5)	12.9 (9)	12.5 (6)	13.0 (9)	12.7 (27)
45-49		14.4 (1)	13.5 (2)			13.5 (4)	13.0 (11)

same number of children. Women with six or more children had a lower mean haemoglobin level than those with fewer children. An attempt was made to determine the effect of age and parity on the haemoglobin levels. *Table III* suggests that there was, if anything, only a slight tendency for the haemoglobin level to decrease with advancing age, even in the presence of high parity. Parity seems to have little effect on the decline of the haemoglobin level with age.

The World Health Organisation (1959) has suggested that a haemoglobin level of less than 12.0 g. per 100 ml. blood should be present before anaemia is diagnosed. On this basis 6.2 per cent (42 cases) of married women were anaemic as compared with 4.5 per cent (15 cases) in unmarried subjects. An effort was made to find the cause of the anaemia; however only 20 patients turned up for further investigation in hospital. *Table IV* gives details of the aetiological factors responsible for the anaemia in the investigated group. An 18 year old unmarried female

with a haemoglobin level of 7.3 g. per 100 ml. blood was found to be suffering from Thalassaemia Minor. Multiparity, poor nutrition and heavy menstrual loss helped to produce an anaemia with a haemoglobin level of 9.4 g. in a 25 year old woman with six children. Bleeding from a hiatus hernia was responsible for the anaemia in one subject, whilst menorrhagia was the cause of the anaemia in six cases. Blood loss from haemorrhoids accounted for three cases, whilst chronic pyelonephritis was responsible for 1 case. No obvious cause of the anaemia could be found in 6 subjects. A deficient diet might also have contributed to the anaemia in those who had large families.

Discussion

The average haemoglobin values of married parous females and unmarried females aged between 15 and 49 are in Malta within the range of average values found in North America and Europe. The average haemoglobin level for the whole group in Malta was 13.6 g. compared to 13.8 g. in Great Britain (Berry *et al.*, 1952), 14.1 g. in Norway (Linneberg *et al.*, 1935), 14.0 g. in the United States (Wintrobe, 1967) 13.8 g. in Canada (Hawkins *et al.*, 1948) and 12.4 to 12.8 g. in Israel (Straus *et al.*, 1961). It is true that the age groups in these various surveys are not strictly comparable, but, as will be shown below, the effect of age on haemoglobin levels is not very great.

In the present study, the effect of age on haemoglobin levels (*Table III*) was not very strong and the figures obtained suggested that there was, if anything, only a small degree of variation in haemoglobin levels among women in the age group studied. This is in agreement with the findings of Sudermann *et al.* (1953) as well as Hawkins *et al.* (1954) though Elwood (1964) found that though the effect of age was weak, it was statistically significant.

High Parity seems to influence the haemoglobin level (*Table II*). In the present series, it was only women with six or more children who tended to have a lower mean haemoglobin level as com-

TABLE IV

Details of 20 Cases of Anaemia in Women

Hb. (g./100ml)	Age	Aetiological Factors
7.3	18	Thalassaemia Minor
8.6	41	Menorrhagia, Multiparity
9.4	25	Menorrhagia, Multiparity, Deficient diet.
9.6	33	Haemorrhoids
9.8	43	Hiatus Hernia
10.1	35	No obvious cause
10.4	33	Menorrhagia
10.5	44	Haemorrhoids
10.5	39	Multiparity, ? Deficient diet
10.8	28	Menorrhagia
10.9	39	Chronic pyelonephritis
11.2	26	No obvious cause
11.3	36	No obvious cause
11.4	32	Menorrhagia
11.4	29	No obvious cause
11.5	38	Multiparity & deficient diet
11.6	27	No obvious cause
11.7	30	Menorrhagia
11.7	25	No obvious cause
11.9	31	Haemorrhoids.

pared with those who had five or fewer children. This is somewhat different from Berry's (1952) finding that women with four or more pregnancies had a lower mean haemoglobin level. Difference in social status did not seem to influence the haemoglobin level as there was no difference in the mean haemoglobin level of the women attending the two hospitals.

Summary

The average haemoglobin level of 1008 Maltese women aged between 15 years and 49 years was investigated. Three hundred and thirty two had no children. The mean haemoglobin level for the whole series was 13.6 g., being also 13.6 g. for the married and 13.7 g. for the unmarried females. Age, parity and social class do not seem to influence the haemoglobin level.

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