

HAEMOGLOBIN, PACKED-CELL VOLUME AND SERUM IRON DURING PREGNANCY IN AN URBAN BANTU POPULATION

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The usual fall in the haemoglobin, packed-cell volume and serum iron values during normal pregnancy can be prevented by the administration of iron during the pregnancy.¹⁻⁵ In a group of Bantu subjects, however, Gerritsen and Walker¹⁰ were unable to show a fall in these values during pregnancy, and attributed this to an involuntary prophylaxis provided by an habitually high iron intake. It was suggested that the iron was derived from iron utensils used in the preparation of food. In support of the concept of an habitually high iron intake, it was stated that in the Bantu 'hypochromic anaemia is extremely rare'.⁹⁻¹³ Cassel and Metz,¹⁴ however, have drawn attention to the fact that these repeated statements are based on nothing more than 'private communications'. Metz¹⁵ after an extensive investigation of hypochromic anaemias in the Bantu (over 300 cases in a 2-year-period) presents examples of apparently 'idiopathic' iron-deficiency anaemia, and draws attention¹⁶ to a severe form of iron-deficiency anaemia occurring in association with malnutrition. These observations were subsequently supported by Greig¹⁷ who found no significant difference in the occurrence rate of hypochromic anaemia in Bantu and White populations in the Southern Transvaal.

Metz¹⁵ states that the repeated use of the term 'hypochromic anaemia' is unfortunate in view of the clear demonstration by Rath and Finch¹⁸ and subsequently confirmed^{19,20} that 'hypochromic anaemia' and 'iron-deficiency anaemia' are not synonymous terms. It must be assumed that by hypochromic anaemia Walker and his co-workers really refer to iron-deficiency anaemia; otherwise it would mean that, for example, the hypochromic form of anaemia which may accompany tuberculosis and other chronic

infections is extremely rare in the Bantu, something which is clearly not intended. It would indeed appear warranted to interpret the statements of the 'extreme rarity of hypochromic anaemia in the Bantu' to mean only that form termed 'idiopathic hypochromic anaemia'.

In view of these observations on iron-deficiency anaemia in the Bantu—and the possibility that if the Bantu have in fact a high iron intake due to the use of iron cooking utensils, the routine administration of iron during pregnancy is unnecessary and may even hasten the development of siderosis—it was therefore considered worth while to investigate the haemoglobin, packed-cell volume, and serum iron concentration during pregnancy in a group of urban Bantu.

MATERIAL AND METHODS

The patients studied were attending the Meadowlands or Baragwanath Hospital antenatal clinics, and the selection of subjects was random. The patients attending the latter clinic are drawn from the surrounding townships and from the employees of the Whites of Johannesburg in approximately equal numbers. Iron was withheld from the patients under study. Haemoglobin, packed-cell volume and serum iron were estimated in 3 groups. Group I were 2-20 weeks pregnant, group II 21-30 weeks pregnant and group III were 31-40 weeks pregnant.

Venous blood was taken between the hours of 10.30 a.m. and 12 noon, with all-glass syringes. The specimens for serum iron determination were placed in iron-free tubes. Haemoglobin was estimated as oxyhaemoglobin in a Klett-Summerson photoelectric colorimeter. Packed-cell volume was read off Wintrobe tubes centrifuged at 3,000 r.p.m. for 30 minutes in a centrifuge with radius 15 cm. The haemoglobin and packed-cell volume determinations were carried out in duplicate. Serum iron was estimated by the method of Bothwell and Mallett.²¹

Results

The results are summarized in Table I. Statistical analysis of the data showed the following differences in the means between the groups to be of significance.

1. Haemoglobin and packed-cell volume of groups I and II ($p = <0.05$), and groups I and III ($p = <0.01$).
2. Mean corpuscular haemoglobin concentration of groups II and III, and I and III ($p = <0.02$).
3. Serum iron of groups I and II ($p = <0.05$).

TABLE I. HAEMOGLOBIN VALUE, PACKED-CELL VOLUME, MEAN CORPUSCULAR HAEMOGLOBIN CONCENTRATION AND SERUM IRON IN AN URBAN BANTU POPULATION DURING PREGNANCY

Group	No. of subjects	Duration of pregnancy (weeks)	Haemoglobin (G/100 ml.)	Packed-cell volume (%)	Mean corpuscular haemoglobin concentration (%)	Serum iron (mg./100 ml.)
I	50	2-20	*13.8 ± 1.2	42 ± 3	32.8 ± 1.5	113 ± 40
II	50	21-30	13.3 ± 1.3	41 ± 4	32.8 ± 1.5	97 ± 33
III	50	31-40	12.9 ± 1.1	40 ± 4	32.1 ± 1.3	100 ± 42

* Mean standard deviation.

DISCUSSION

The demonstrated fall in haemoglobin, packed-cell volume and serum iron in the present series is similar to that reported in studies on White females.^{2,1,22-24} This finding differs from that of Gerritsen and Walker,¹⁰ but the series studied by these authors and the present series of patients are not strictly comparable. The group studied by Gerritsen and Walker¹⁰ were mainly rural Bantu, who apparently used iron cooking utensils. The present cases were urban Bantu, and an attempt was made to estimate to what extent iron cooking utensils were in use. 1,000 females attending the hospital were questioned as to their cooking habits; 29 (2.9%) admitted to using, or having in the past used, iron vessels for cooking. A further 75 subjects stored food in paraffin tins. The hospital staff engaged on home visits confirmed that iron cooking utensils were rarely observed in the township homes. A number of store-keepers in the townships were visited; a total of 10 stores sold less than 60 iron pots in one year.

The results of this study correlate with other observations on iron deficiency in the urban Bantu population under study. Iron deficiency anaemia is frequently en-

countered¹⁴ and evidence of iron deficiency can be demonstrated during normal pregnancy. Study of the cooking habits of the urban Bantu population around Johannesburg indicates that iron cooking utensils are rarely used, and the iron intake is therefore unlikely to be increased by adventitious iron. On the evidence presented in this study, oral iron would be as much indicated in the prevention of the iron deficiency state which arises in the urban Bantu during normal pregnancy, as in the White population.

SUMMARY

The haemoglobin, packed-cell volume and serum iron values have been determined in a group of urban Bantu during pregnancy. As pregnancy progresses, these values fall in a similar fashion to that reported in studies on White females. The fall in these values is regarded as a manifestation of iron deficiency, and can probably be prevented by the routine administration of iron during pregnancy.

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