HAEMOGLOBIN LEVELS IN PREGNANCY*

A report on 200 cases in general practice

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In Bristol at the present time 86 general practitioners do their antenatal work at 14 local health authority clinics in various parts of the city. This scheme has already been fully described[1] and the services we enjoy greatly facilitate the recording of the usual examinations such as weighing, urine testing, and the estimation of haemoglobin levels; it is with the last named that this paper is concerned.

This is a study of 200 pregnancies in general practice, half of them from the William Budd Health Centre and half from the local health authority clinic at Broadfield Road, Bristol. They were not selected in any way but were taken as the mothers came up to an ordinary surgery session and were then referred to the antenatal clinic. Only completed pregnancies are here included.

Procedure at both clinics is the same. At the first attendance, as part of the general examination, blood is taken from a vein and the Hb. level estimated using a Grey Wedge colorimeter. This is done for us by members of the nursing staff of the central clinic and the high degree of accuracy they have attained over the past few years is shown in the occasional checks with the hospital laboratory.

The estimation of the haemoglobin level by this or similar scientific method is regarded as being essential and little reliance is placed on the colour of the conjunctivae or palms of the hands. Likewise the appearance of the mother can be very misleading, it is sometimes found that the pale patient has a normal haemoglobin level while one with good colour may be well below average.

In addition to the usual vitamin tablets, iron as Tabs. Ferrous Gluconate is given as routine free from the first attendance onwards throughout the pregnancy and puerperium as well as a months supply at the final postnatal examination six weeks after delivery.

The importance of taking the iron regularly is emphasized by both doctor and midwife and it is thought important to tell the

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mothers why it is given, what the haemoglobin figures are, and what they mean. From personal knowledge of the patients it is estimated that all of them at Broadfield Road would take the iron regularly and about three quarters of those at the William Budd.

The dosage is three tablets daily, to be taken one with each meal as this way seems to cause less upset. Most mothers tolerate this form of iron very well but for those who do not, another preparation such as fersolate, colliron, or neoferrum is given. Because of nausea and morning sickness in early pregnancy some mothers find they cannot take the full dosage at first so they are advised to take the tablets later in the day when they feel better, or even on alternate days, on the principle of, better a little iron than none at all. Those who could not take oral iron in any form were given it intramuscularly and this was also done for the few cases which showed a poor response to the oral iron.

Three haemoglobin estimations were made as routine in all cases at the first attendance, at the 32nd week and at the final postnatal examination. More were made where necessary when the initial reading was low or in the cases where the response to iron was thought to be unsatisfactory. Full blood examination was made in all those cases which were reported as being consistent with iron deficiency, no cases of megaloblastic anaemia being identified in this series. The initial readings were divided into four groups, 90 per cent and above, 80—89 per cent, 70—79 per cent, and below 70 per cent. Using an adding machine the mean of each group was obtained and the corresponding readings of these same patients at the second and final examinations were also grouped and mean values obtained in the same way. This is shown in table I and the four sets of figures are plotted as a graph in figure 1.

TABLE I

HAEMOGLOBIN LEVELS IN PREGNANCY

200 Cases in General Practice

Group Hb per cent	*No. of cases*	*Haemoglobin Levels (per cent)*					
		*Initial exam.**		*32nd Week*		*Postnatal*	
		Mean	*Range*	*Mean*	*Range*	*Mean*	*Range*
90—	35	94	90—103	84	66—104	88	70—102
80—89	118	84	80—89	80	63—96	87	66—104
70—79	41	75	70—79	78	60—96	85	68—102
under 70	6	67	64—69	82	79—86	85	73—101
All cases	200	83	64—103	81	60—104	87	66—104

* Varied from 8 to 30 weeks; Mean time was 16 weeks.

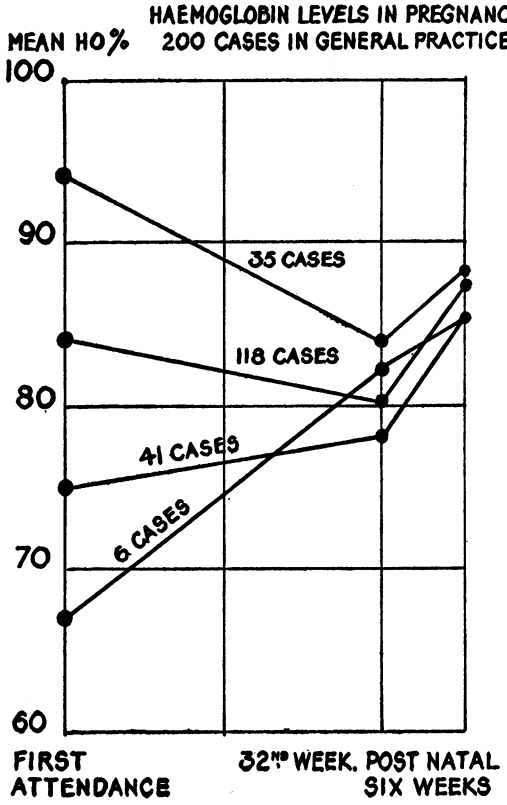

Figure 1

Discussion

Although the two clinics serve areas of differing social standards figure 1 shows that the initial haemoglobin level in both is fairly good. Of the 200 pregnancies only 6, i.e. 3 per cent were below 70 per cent while the majority 153, i.e.. 76 per cent were above 80 per cent. The graph shows that in those cases within the mean of 80 per cent and above there is a fall at the 32nd week whereas those within the mean below this figure shows a rise at this time. This would seem to suggest that the process of haemodilution or physiological anaemia does take place in pregnancy despite the taking of iron and is the explanation of the fall in those with initially high levels and also why those with initially low levels are prevented from reaching higher than 80 per cent round about the 32nd week. Study of individual cases in table I shows that in some with high initial readings there is a rise at the 32nd week as though to suggest that

haemodilution does not take place. It is noted, however, that the final postnatal reading in those cases are for the most part higher than the initial ones and this seems to indicate that these women have as their normal haemoglobin levels higher than the average and were relatively iron deficient at the start of the pregnancy. A further explanation may be that the haemodilution had attained its maximum before the 32nd week and had already lessened by that time. Further studies now in progress suggest that this maximum varies in different mothers and may occur at any time in the third trimester. A few of these pregnancies have recently been completed and the results tend to show that giving folic acid from the first attendance does not affect the position. Further the haemodilution may persist up to within ten days of delivery even in the presence of adequate reticulocyte activity.

Conclusion

It is common experience that there is a period in pregnancy when the mother feels at her best and this is usually about the third trimester. This may well be related to the haemodilution which occurs about this time and seems to indicate that there is a physiological optimum level of haemoglobin which in this series is round about 80 per cent. (Some of the mothers who looked and felt extremely well had haemoglobin levels well below this). This figure has been reached with an adequate iron intake throughout the pregnancies. Where, as Giles and Burton[2] show, iron was not given, the levels are lower. Figure 1 shows quite clearly that in all groups except the highest the final postnatal haemoglobin was higher than the initial one and suggests that a good many women start pregnancy relatively iron deficient. Iron should therefore be given as routine in all pregnancies. It has been suggested[3] that it may not be necessary to give iron for the whole of the pregnancy and this may be true in some cases. In view of the widespread prevalence of iron deficiency anaemia in women of childbearing age I feel it is much safer to give the iron right from the first attendance.

Summary

Observation of haemoglobin levels in 200 pregnancies in general practice confirms that haemodilution takes place and while adequate iron intake does not prevent it, it does ensure that it does not fall below a certain level which may well be a physiological optimum. The case for giving iron routinely to all expectant mothers would seem to be fully established.

There is a fair amount of literature on this subject and I freely acknowledge my indebtedness to those listed below.[4 5] What I have read has shown me that we still know very little about what happens

to the blood in pregnancy and why.

Acknowledgements

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A Geriatric Survey in a General Practice. R. L. MEYRICK, M.B., *The Lancet* (25 Aug. 1962) **2**, 393.

Dr Meyrick studied the conditions and difficulties of 397 of his patients aged over 65 years by means of a questionnaire, interview, and survey of their medical records. His main conclusion was that expansion of the domiciliary services is needed so that old people can be maintained in independence as long as possible. Their ignorance of the social services was amazing, 100 of the patients not knowing about the district nursing service and 138 not knowing about meals-on-wheels. Yet all but 76 knew of the home-help service and the Citizen's Advice Bureau. Fourteen of the patients had great difficulty financially, and are now receiving State supplementary pensions (presumably the solution to this problem had to be discovered for them). Much more publicity of what is provided is necessary.

The author suggests that retirement is often a mistake, and a better plan would be for the worker to continue in less arduous toil in his later years. As means of drawing attention in emergency Dr Meyrick mentions an emergency card in the window, a volunteer street warden service, or an approach to the large dairy companies so that cases of distress could be efficiently brought to light.