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PATTERN OF ANAEMIA AND ITS EFFECTS ON PREGNANT WOMEN IN MALAYA

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The problem of anaemia in pregnancy is still the nightmare of practising Obstetricians in this country. In spite of increasing attention to maternal welfare and the opening of rural health centres and midwife clinics to serve the remote rural areas and the great stress on nutrition, the general standard of health is low and the incidence of anaemia high. Several factors are responsible, social, economic, educational, religious, racial.

(a) The common belief among all races that excessive and nutritious food give rise to big babies and difficult labours.

(b) Pregnancy is not looked upon as something that requires extra care and an adequate well balanced diet and antenatal examinations.

(c) A great deal of emphasis is placed on the taste of food rather than its nutritional value, and the role of food in the budget is made secondary to other comforts in life.

(d) Often the family is big and demands on the mother in the home are great, and she has no time to attend clinics earlier in pregnancy and regularly.

(e) The rural folk generally are timid and shy and need persuasion to make up their minds to attend the clinics.

There is no doubt that the standard of living has to be increased and with the increasing remuneration the level of nutrition of the population as a whole will be improved. At present with the increase in tempo of health education in the rural areas and the setting up of midwives clinics to every 2,000 of the population and regular home visiting the antenatal attendance is increasing.

Incidence

In order to assess the average haemoglobin level a survey was done on a thousand consecutive pregnant mothers attending the Maternity Hospital antenatal clinic, for the first time, and the results were as in Table I.

It must be noted that these patients are all town dwellers, and therefore in a better state of nutrition than the rural population.

The above figures give roughly the percentage of different racial groups attending the Maternity Hospital antenatal clinics. The Malays although they form 50 per cent of the population do not fully utilise the hospital services and form only 11.7% of this group of cases. The average haemoglobin for all was 68.8 per cent, the highest level being among the Europeans and others, and the lowest for the Indian patients. The latter generally suffer from the most severe anaemia seen in this hospital.

Roscoe and Donaldson (1946B) have suggested haemoglobin 76 per cent (Haldane) or 11 gm. per cent as the lowest limit of normality

TABLE I

Nationality	Number of Patients	Percentage	Average Hb. Sahli's
Chinese	400	37.2%	65.7
Indians	360	33.5%	65.6
Malaysians	128	11.7%	66.4
Others (Europeans, Eurasians, etc.)	188	17.6%	78.7
Total	1,074		68.7%

TABLE II

Incidence of severe Anaemia (1957 – 1961)

Total No. of Anaemia cases (below 6.5 gm.%)	1066
Total No. of Deliveries	46,912
Incidence of severe anaemia	2.2%

Year	Haemoglobin levels		
	0.0 — 2.49 gm.	2.5 — 4.9 gm.	5.0 — 6.5 gm.
1957	2	83	124
1958	1	86	113
1959	1	86	218
1960	5	62	150
1961	3	45	78
Total No. patients	12	362	683
Percentage	1.1%	33.9%	65%

during the later stages of pregnancy. After giving due allowance for physiological hydraemia and haemodilution and assessing the mothers on the above standard, 76.9 per cent of those attending the clinic should be classed as anaemic.

This figure is too numerous to be recorded on the Royal College of Obstetricians and Gynaecologists standard record book, and only those with haemoglobin of 6.5 gm. per cent and below were recorded as anaemia. Analysis of these severe anaemias which number 1066 cases for the years 1957 to 1961 is given above.

The majority of anaemic mothers were multiparous. Primigravida formed only 6 per cent of the total, thus emphasising that with increasing parity the tendency to anaemia is greater.

35 per cent of patients in this series had haemoglobin less than 5 gm. per cent.

Varieties of Anaemia

Accurate records of the types of anaemia are available in this survey, for the three years 1957 – 1959 and the diagnosis has been confirmed by bone marrow biopsies when required.

Microcytic Anaemia of Pregnancy

Microcytic anaemia is the commonest as expected and forms 76.27% of the total number of patients. Two main factors which combine to produce this picture are defective nutrition and iron deficiency.

(a) Defective nutrition

The diet usually is of a high carbohydrate and low protein content. Rice is the staple diet of all the three races and is consummed in relatively large quantities by the poorer social class. Though the caloric in-

TABLE III

Varieties of Anaemia

	1957	1958	1959	Total	Percentage
Microcytic Hypochromic	139	148	265	552	76.27
Di Morphic Anaemia	1	1	5	7	0.96
Macrocytic Anaemia	69	52	39	160	22.09
Haemolytic Anaemia	3	1	1	5	0.68

take may be high and iron present in sufficient quantities, the low content of calcium and the high content of phosphates in the rice creates the iron deficiency due to the formation of insoluble iron phosphates and phytates. Protein is essential in globin synthesis and the average intake falls far below that of 80 – 100 gms. of protein required daily during pregnancy. The main reason is an economic one, as protein foods are expensive. Therefore, emphasis must be made on increased consumption of cheaper forms of animal and vegetable protein, for example, soya bean, cake, pulses, fish, milk powder, etc.

(b) Iron deficiency

The average parous woman before conception occurs, is anaemic, loosing over 25 mgm. iron during normal menstrual periods. Approximately 500 mg. of iron are required in the course of pregnancy for the increase in maternal tissues and growth of foetus, and a further 400 mg. to compensate for the variable blood loss at birth and the needs of lactation. In addition there is a natural loss of 1 mg. iron excreted per day in faeces and urine and skin.

Iron deficiency may arise due to inadequate intake of iron, the average requirement being 15 – 20 mg. per day, defective absorption, increased demands for iron due to haemorrhage, infection and inhibition of the bone marrow.

(c) Hookworm infection is a potent and continuous cause of haemorrhage in the intestinal tract. Incidence of infection confirmed by stools was 14 per cent in this series. These figures are rather low and would be higher if repeated stool examinations were done. Sandosham (1955) in his analysis of hospital patients in Malaya records a figure of 30.6 per cent infection rate.

Blood loss from this cause has been determined by 51 Cr red cell labelling method by Tasker (1961). A daily haemorrhage of 8 ml. to 90 ml. occured depending on the degree of infestation. At normal haemoglobin levels iron loss varies between 1 mgm. and 40 mg. per day. Therefore, on a marginal dietary intake of iron such a loss could result in a negative iron balance.

2. Macrocytic Anaemia of Pregnancy

The literature on megaloblastic anaemia is enormous and briefly it may be summarised as follows:—

Nucleic acid which is essential for development of nuclei of cells is formed from amino acids. Folinic acid formed by the reduction of folic acid which is found in fresh leafy vegetables and also produced by bacterial metabolism in the gut, acts as coenzyme in conversion of amino acids to purines and pyramidines which in turn form nucleosides and nucleotides with the coenzyme vitamin B_{12}.

During pregnancy with increasing growth of the foetus, especially in the last trimester, the demand for folic acid is increased. Maternal serum and urinary levels of vitamin B_{12} tend to fall during the course of pregnancy and the clearance of intravenously injected folic acid increases in normal pregnancy and even more so in megaloblastic anaemia, suggesting folic acid deficiency (Chanarin Gibbon, 1958). Further at delivery, infants serum levels of vitamin B_{12} and folic acid are generally found to be considerably higher than the mothers, indicating that dietary resources are inadequate to meet the needs of the mother and this is an important factor in the aetiology of megaloblastic anaemia.

There is derangement of red cell maturation and abnormal nucleated precursor cells are found in the bone marrow. The peripheral blood shows megaloblastic hypochromic anaemia without reticulocytosis and there is considerable variation in size and shape of cells. Megaloblasts are not usually seen in the peripheral blood but can be demonstrated in most cases in the films made from the leucocytic layer after centrifugation. Unless these are demonstrated, bone marrow examination must be done before specific treatment is instituted, otherwise the diagnosis becomes difficult, if not impossible.

The Effects of pregnancy on the Anaemia

The effects on the mother depend mainly on the severity and duration of anaemia. With moderate degrees of anaemia the patient is able to carry on her daily activities and any limitation of this is usually attributed to

the pregnancy itself. The commonest symptoms were generally anorexia, lassitude, giddiness, pallor, breathlessness with oedema, paraesthesia, and soreness of the tongue and angles of the mouth in advanced cases. Even in severe cases one is surprised how the pregnant mothers with 6.5 gm.% haemoglobin, are able to go about their daily work, and attend the clinics from long distances. Even more shocking is that group below 5 gm.% haemoglobin who show their ability to live with such low haemoglobin levels, and go about their daily domestic duties without much handicap. As pregnancy progresses, anaemia becomes worse, with evidence of heart failure.

Macrocytic anaemia is generally noted in the third trimester when there is rapid growth in the weight of the foetus, and folic acid requirement is high. The onset is often gradual, but may be acute with pyrexia often precipitated by toxaemia haemorrhages. Gastro intestinal symptoms tend to occur and splenomegaly and hepatomegaly may be present.

Spontaneous improvement tends to occur after parturition but treatment with folic acid should be continued in the puerperium until the picture has become normal for 2 months.

Effects of anaemia in Pregnancy, Labour and Puerperium

1. Abortions

Spontaneous termination of pregnancy before 28 weeks occured in only 21 patients, giving an incidence of 4.12 per cent which shows that anaemia does not give rise to an increase in abortion rates.

2. Pre-eclamptic toxaemia

Anaemia is said to predispose to pre-eclamptic toxaemia (Moore and Phillman Williams, 1936). The following table illustrates this:—

There is a statistically significant increase in pre-eclamptic toxaemia, the incidence being 7.5 per cent as against 4.5 per cent, the overall incidence for all cases admitted into this hospital.

3. Accidental Haemorrhage

There were 18 cases of accidental haemorrhage giving an incidence of 1.6 per cent which is about the average occurence of abruptio placenta (Allen Brews and Bender).

4. Placenta praevia

This showed no increased incidence and occurred in 0.4 per cent of patients in this series.

5. Premature labour

Excluding such other causes of premature labour as pre-eclamptic toxaemia, twin pregnancies, foetal abnormalities, antepartum haemorrhages, there is a high incidence with no other obvious cause except presence of anaemia.

This high incidence of premature labour is without doubt correlated with defective nutrition. This is borne out by investigations of the Peoples League of health investigation (1938), which showed a statistical significant decrease in prematurity rate in patients whose diet was supplemented with calcium, iron and vitamins. However, during the war years in Britain due to full employment and an enlightened food policy a fall in prematurity rate, especially in cases of prematurity, cause "unknown," occured in conditions without doubt related to maternal health (Duncan, Baird, Thomson, 1952).

Pre-eclamptic toxaemia

	Total No. of anaemias	Mild and Moderate	Severe	Total	Incidence
1960	212	3	9	12	5.7%
1961	126	5	7	12	9.3%
1962	172	9	5	14	8.2%
Overall incidence = 7.5%					

Duration of Pregnancy

	Term	36–39 weeks	28–36	Less than 28		Total
1960	32	118	47	6	9	212
1961	31	62	20	2	11	126
1962	19	115	26	4	8	172
	82	295	93	12	28	510
Total	16.1%	57.8%	18%	2.4%	5.6%	

The above figures indicate that only 16.1 per cent in this series went to full term, the majority delivered between 36 and 39 weeks while 18.2 per cent delivered between 28 to 36 weeks.

6. Duration of labour

Although progress of labour is governed by many factors, by both physiological and obstetrical complications, the majority of the patients delivered in 24 hours. The patients seen for the first time in labour are carefully observed with suitably matched and packed blood cells available for use at a moments notice. Transfusion is given only when there is a haemorrhage during or after delivery. The experience generally is that anaemic patients have easy, quick and spontaneous labours illustrated by the table below:—

7. Forceps delivery

The incidence was 2.9 per cent much lower than the 10 per cent overall incidence. This is due to high incidence of premature labour and small sized babies.

8. Postpartum Haemorrhage

The incidence is low as well as the amount of loss. In assessing postpartum haemorrhage as a blood loss of 20 Ozs. or more, the incidence is 1.51%.

Duration of Labour

	MULTIPARA		PRIMIGRAVIDA		
	Less than 12 hours	More than 12 hours	Less than 24 hours	More than 24 hours	Total
1960	178	9	11	2	200
1961	83	24	4	0	111
1962	122	31	7	4	164
	383	64	22	6	475
Multipara	85.9%	14.1%	88.5%	11.5%	

	Total No. of Cases	Blood loss 10 to 20 Ozs.	Postpartum haemorrhage Blood loss. 20 Ozs.+
1960	212	4	nil
1961	126	24	4
1962	172	10	4
	510	38	8 (1.51%)

The patients generally were more prone to shock, the loss of even 10 ounces of blood gave rise to signs and symptoms of shock and the need for blood transfusion was greater. Suitably matched and packed blood cells is always kept readily available for use at a moment's notice.

9. Puerperal pyrexia

84 patients (16.5 per cent) had puerperal pyrexia which is a high incidence.

Malnutrition and anaemia cause a general lowering of tissue response to infection, and increased morbidity (Bickerstaff, 1942). With the use of antibiotics, this complication is easily treated but convalescence is generally prolonged.

10. Phlebo-thrombosis

There were no cases of phlebothrombosis in this series. The incidence of Phlebothrombosis among pregnant mothers is very low in all races although the incidence of varicosities is the same as in European countries. With the increased rate of febrile morbidity in the puerperium one would expect an increased incidence of phlebothrombosis, but there were no such cases in this series.

Effect of pregnancy on the foetus

1. The weights of foetuses generally are lower than in comparable women of good nutrition. 58 per cent of babies born to anaemic mothers were more than 5½ pounds (2500 grams) and above and 182 (17.1 per cent) were below 4½ pounds (1500 gm.). This has resulted in a perinatal mortality of 15.5 per cent. The breakdown of these figures is as follows:—

Foetal Weights

	Up to 4½ lbs.	4½–5½ lbs.	5½–6½ lbs	6½ lbs.
1957	37	53	56	60
1958	41	48	60	53
1959	41	90	97	80
1960	27	48	69	68
1961	36	26	36	37
Total	182	265	318	298

2. Foetal loss associated with anaemia (1957 - 1961) in 1066 cases.

	Mature	Premature	Previable	Abortion	Total
Neonatal deaths	11	36	5	0	52
F. S. B.	39	27	4	0	70
M. S. B.	11	9	2	0	22
Aborted	0	0	0	21	21
Total	61	72	11	21	165

The foetal loss of foetuses was 15.5 per cent. The perinatal mortality is higher. 61 foetuses died at term. Of these 50 were stillborn, 72 were prematurely delivered and 36 were stillborn. Thus there is definite evidence that there is a greater perinatal mortality, and increased incidence of stillbirths. The main factor is anoxia in utero.

The factors that determine the stillborn and neonatal mortality are complex. D. Baird's (1945, 1947) observations in Aberdeen support the view that the child's prospects both before and after birth are greatly influenced by the health of the mother during pregnancy, and it is probable that suitable and satisfactory environmental conditions along with antenatal

and obstetrical care will result in a lower perinatal mortality.

In anaemic mothers there is a greater risk of anoxia to the foetus developing in utero and accentuated during the process of labour, thereby causing intra uterine death and fresh stillbirths. Further the increase in premature labours with 42 per cent of babies below 5½ pounds (2,500 grams) has considerably increased the total foetal loss to 15.5 per cent.

3. Twin pregnancies

There is an increased number of twin pregnancies in this series giving an incidence of 2.9 per cent.

4. Congenital abnormalities

There were only 2 skeletal abnormalities out of 510 severe anaemias (1962), an incidence of 0.93 per cent. Therefore, anaemia does not seem to increase the incidence of developmental abnormalities. It is quite probable that these patients were not so anaemic earlier in the first trimester when there is active organo-genesis, when anoxia may be a contributing factor to abnormal development.

Maternal mortality

There were 13 deaths in this series of 1066 severe anaemias, an incidence of 12.1 per thousand. All of them were seen as emergencies for the first time with little or no antenatal care. Causes of deaths were as follows:—

Anaemia cardiac failure	6
Anaemia enteritis	2
Anaemia with severe pre-eclampsia ...	1
Anaemia and antepartum haemorrhage	1
Anaemia with hydatidiform mole ...	1
Anaemia, obstetric shock	1
Total ...	12

The main cause of death as seen above is anaemia with cardiac failure. The general rule is to treat the cardiac failure and no active intervention is done with respect to delivery. Pregnancy is allowed to take its natural course. Packed cell blood transfusions are reserved for use only in cases seen in the last four weeks of pregnancy and even then small transfusions are given. General transfusions are avoided during labour and given only when there is a postpartum haemorrhage. Prophylactic intravenous ergometrine is given with the delivery of the head. Anaemic patients do not tolerate transfusion well, but if it has to be given, then great care must be taken to give packed red cells very slowly, watching for reactions and early evidence of overloading and cardiac failure recognisable by distension of the external jugular veins.

Exchange transfusions appear to be the method of choice, i.e., replacing with blood of high Haemoglobin content without increasing total blood volume, thereby not overloading the heart.

Summary

1066 cases of severe anaemias of pregnancy (6.5 gm. and under) admitted into the Maternity Hospital, Kuala Lumpur, during the years 1957 - 1961 have been reviewed.

22.09 per cent of them (1957 - 1959) were macrocytic anaemia of pregnancy.

There is definite evidence of increase in the incidence of pre-eclamptic toxaemia, twin pregnancies, premature labour, puerperal pyrexia and premature babies, as well as increased perinatal mortality and maternal mortality.

There is urgent deed to detect and treat this all important condition of anaemia in pregnancy. We are given ample time, that is 9 months to treat these patients, and there should be no difficulty to bring them to an optimum state of physical fitness to bear the stress of parturition.

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