

# THE INCREASING IMPORTANCE OF VITAMIN B12 DEFICIENCY AS A CONTRIBUTING FACTOR TO ANEMIA IN MALAYSIA

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**Abstract.** A comparative study was done to determine the profile of vitamin B12 and folate status in Malaysians during two different periods. For the period of 1987/88, we analysed a total of 9,162 cases (inpatients) referred for vitamin B12 estimation and 10,290 cases for folate estimation. We found that 2.6% were vitamin B12 deficient and 31.2% were folate deficient. For the period of 1992/93, of the 9,962 cases assayed, 8.2% were found to be vitamin B12 deficient whereas 7.6% of the 10,355 cases referred were folate deficient. Vitamin B12 and folate were assayed either using microbiological or radioassays. These findings indicate that there appears to be a change in the status of both vitamin B12 and folate over the five year interval.

## INTRODUCTION

Deficiency of hemopoietic nutrients such as iron, folate and vitamin B12 has been reported by many as a major contributing factor to anemia in pregnancy amongst Malaysians (Tasker *et al*, 1956; Tasker, 1958). Folate deficiency is said to be more frequent, due to poor dietary intake, than vitamin B12 which is available in most animal products (WHO 1975 ; Baker, 1978).

In view of improvements in the socio-economic status of Malaysians and the increasing preference for healthy life-style living, we decided to determine the incidence of vitamin B12 and folate deficiencies as contributing factors to anemia amongst patients admitted to hospital with this problem. We compared the status for these two nutrients between two periods 5 years apart; the eighties (1978/88) versus the nineties (1992/93).

## MATERIALS AND METHODS

Determination of prevalence was done on the results obtained from cases referred to the Institute for Medical Research, Kuala Lumpur, Malaysia for the estimations of vitamin B 12 and folate during two periods of five year intervals. The specimens sent were from patients with anemia for investigation from hospitals all over Malaysia.

Measurements for vitamin B12 and folate levels were done either by microbiological or radioassays (Chanarin, 1969; Beck, 1983; Rothenberg and da Costa, 1976). The level of < 3 ng/ml for folate using either method, was taken to be deficient. Similarly, a level of < 100 pg/ml for vitamin B12 using

microbiological assay and < 200 pg/ml using radio assay was considered deficient.

Comparisons of the prevalence of vitamin B12 and folate deficiency were done both between and within the two periods studied.

## RESULTS

Prevalences of cases deficient in vitamin B12 and folate, in the two periods, are shown in Table 1. The prevalence of folate deficient cases was significantly higher than that of vitamin B12 for the 1987/88 period. However, for 1992/93 cases, the incidences were almost similar for both vitamin B12 and folate.

A comparison between the two periods showed a 3-fold increase in the incidence of vitamin B12 deficiency during 1987/88 as compared to 1992/93. In contrast, there was a 4-fold decrease in the incidence of folate deficiency (Fig 1). An ethnic break down for vitamin B12 deficient cases done for the

Table 1

Proportion of folate vitamin B12 deficiency amongst anemia patients in the two periods 1987/88 and 1992/93.

Period	Folate deficiency	Vitamin B12 deficiency
1987/88	31.2% (n = 10,290)	2.6% (n = 9,162)
1992/93	7.6% (n = 10,355)	8.2% (n = 9,962)

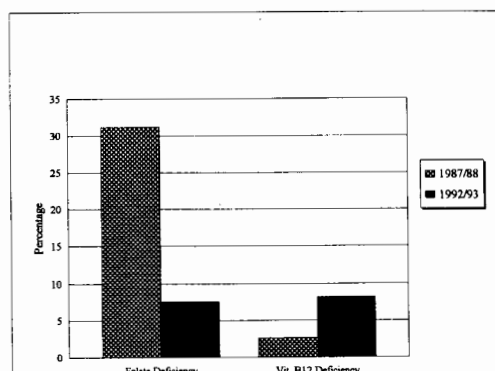


Fig 1—Changes in percentages of folate/Vit, B12 deficient cases during the period 1987/88 and 1992/93.

1992/93 period revealed 49% of the cases to be Indians, 26.9% Malays, 19.8% Chinese and 4.3 % others.

#### DISCUSSION

It is generally accepted that folate deficiency is more common than vitamin B12 deficiency and their contribution to anemia has been widely indicated in most studies. Poor diet is usually the major cause for the folate deficiency in contrast to vitamin B12 where dietary cause is said to be the least important. Folate is available in a variety of plants and animal foodstuffs whereas vitamin B12 can mainly be obtained from animal products.

The higher incidence of folate deficiency (31.2 %) as compared to vitamin B12 (2.6%) in our cases seems to support the above proposition. However, the 1992/93 cases analysed did not exhibit similar findings. The increase in incidence of vitamin B12 deficiency over the five year interval seems to suggest an increasing importance of vitamin B12 deficiency as a contributing factor to anemia in our cases. Due to lack of clinical data, we are unable to elucidate the actual cause for this deficiency. The improvement in the socio-economic status in the country as a whole followed by a better standard of education amongst our people has probably greatly improved the quality of food intake thus contributing to the decrease in incidence of folate deficiency. However, these changes did not improve the status of vitamin B12. We postulate this may be due to the choice of food rather than poor diet. As a result of a general awareness about healthy living habits in relation to cardiovascular diseases which can be acquired from ingesting too much meat, it is possible that meat products

are now avoided in preference to food of plant origin. The preference for vegetarian diet could have attributed to the increase in vitamin B12 deficiency as this vitamin is mainly found in animal products.

This postulation is supported by the finding that 49% of our vitamin B12 deficient cases are Indians, disproportionate to their representation in the population. The association between vegetarian diet in the Indians and vitamin B12 deficiency has been observed. Religious or cultural reasons are probably important factors here. The role of alcoholism in contributing to vitamin B12 deficiency cannot be excluded and again the increased intake of alcohol amongst the Indian community is generally known.

There is a need therefore, to examine the degree of influence vegetarian diet has on the incidence of vitamin B12 deficiency in this country.

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#### REFERENCES

- Baker SJ. Nutritional anaemia : A major controllable public health problem. *Bull WHO* 1978 ; 56 : 659 - 75.
- Beck WS. The assay of serum cobalamin by *Lacto-bacillus leichmannii* and the interpretation of serum cobalamin levels. In: Hall LA, ed. *The Cobalamins*. Edinburgh : Churchill Livingstone, 1983; 31 - 50.
- Chanarin I. *The megaloblastic anaemias*. 1st ed: Oxford: Blackwell 1969 : 308 - 28.
- Rothenberg SP, da Costa M. Folate binding proteins and radioassay for folate. In : Hoffbrand AV ed. *Clinics in Hematology : The Megaloblastic Anaemias*. WB Saunders. 1976; 569 - 87.
- Tasker PWG. Anaemia in pregnancy : A five year appraisal. *Med J Malaysia* 1958; 13 : 3 - 10.
- Tasker PWG, Richardson AM, Llewellyn-Jones DL. Anaemia in pregnancy as encountered in Malaysia. *J Obstet Gynaecol* 1956; 63 : 409 - 14.
- WHO. Control of nutritional anaemia with special reference to iron deficiency. Report of an IAEA/USAID/WHO Joint Meeting. *WHO Tech Rep Ser* 1975; 58.