

Effect of nutritional status on total parasite count in malaria

S.H. Ahmad, M.D., R. Moonis, M.B.B.S., T. Shahab, M.D., H.M. Khan,* M.B.B.S. and T. Jilani,† Ph. D.

Effect of nutritional status as reflected by weights for age on total malarial parasite count was studied in 75 children. P. vivax was seen in 31 and P. falciparum in 44 of them. In 15 patients with normal weight for age mean absolute parasite count was 12200. The mean total malaria parasite count in PEM grade I was 9741; 4260 in grade II; 4286 in grade III and 596 in PEM grade IV. Statistical evaluation revealed a significant positive correlation ($r=0.98$) between nutritional status and total parasite count.

Key words : Malaria; total parasite count; nutritional status.

Interaction between nutritional status and infection constitutes an interesting area of research. The influence of PEM on the outcome of common pediatric infections like measles, pertussis, tuberculosis and poliomyelitis has been studied in depth. There is a paucity, however, of similar information pertaining to malaria.¹ The present work, which is a part of an on-going prospective study of malaria in children, was therefore undertaken to analyse the effect of nutritional status on the degree of parasitemia in malaria in children.

Material and Methods

The study sample comprised 75 children suffering from malaria. The diagnosis

in each case was based on a positive peripheral blood smear report, stating the parasite species as well. Further, absolute malarial parasite count was calculated for every patient on the basis of the number of parasites seen per 100 white blood cells and the total leucocyte count of the patient.¹

The anthropometric measurements of all the 75 patients were carefully taken by one of us (RM), employing standard techniques and equipment. The children were classified into weight for age groups.²

Results

There were 31 cases of *P. vivax* malaria as against 44 due to *P. falciparum*. It included 45 boys and 30 girls. The break-up of the study sample according to age showed that 23 of them were between 0-4 year while 23 and 24 belonged to the age groups 4-8 and 8-12 yr respectively.

The data correlating parasitemia and nutritional status is shown in the Table. Over 63 per cent of malnourished children

Departments of Pediatrics, Microbiology* and Civil Engineering, Girl Engineering† Aligarh Muslim University, Aligarh

Reprint requests: Dr. S.H. Ahmad, Department of Pediatrics, J.N. Medical College, Aligarh Muslim University, Aligarh 202001.

Table. Correlation between nutritional status and degree of parasitemia

Parasitemia	Nutritional status				Total	
	Nutri- tionally healthy	PEM				
		Gr. I	Gr. II	Gr. III		Gr. IV
0—5,000	0	4	3	17	6	30
5,001—10,000	0	7	1	0	0	8
10,001—15,000	15	4	2	1	8	22
15,001—20,000	0	5	2	1	0	8
20,001—25,000	0	5	2	0	0	7
Total	15	25	10	19	6	75

had parasite count of less than 10,000 as compared to home among normal weight for age patients. Majority of the patients having parasite count below 10,000 were severely malnourished. The data was statistically analysed for the degree of correlation and the form of relationship between normalised weight of the patients and malarial parasite count. As evident from the Fig., a Pearson product-moment correlation coefficient $r=0.93$, thus obtained was significant at one per cent level ($t_{obs}=8.53$, $t_{tab}=5.83$ with 3 df). This suggests that normalized weight and malarial parasite are highly correlated. Using standard techniques,³ the relationship between body weight (X) and parasite load (Y) was found to follow the equation $Y = -12497.10 + 283.57 X$.

This regression line along with the experimental points is shown in the Fig.

Discussion

The study showed that a significant positive correlation existed between the nutritional status and the absolute malarial parasite count. This is in agreement

with the findings of Hendrickse *et al* from Nigeria.¹ However, there is hardly any other comparable study either from India or any where else.

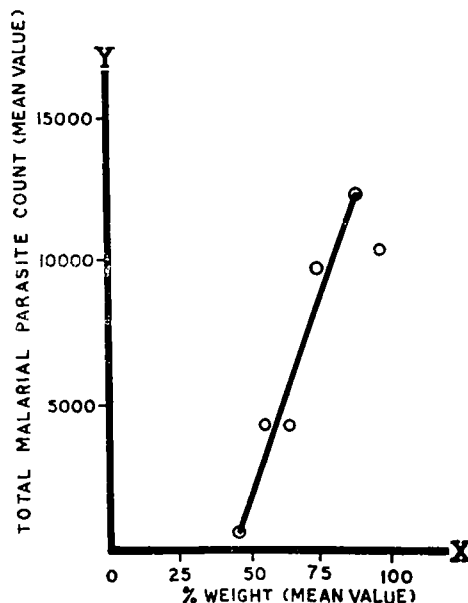


Fig. The correlation between normalized weight and malarial parasite count.

$$Y = -12497.10 + 283.57 X.$$

$$(r=0.98).$$

The fall in total malarial parasite count with increasing severity of PEM could perhaps be explained on the basis of decreased RBC survival time and reduced hematocrit and hemoglobin concentration, reported to occur in PEM.^{4,5} The trophozoites may therefore, perhaps have less oxyhemoglobin to feed upon. Further, since protein metabolism of malarial parasite is closely linked with oxidation of glucose⁵, hypoglycemia seen in patients of PEM may be yet another factor responsible for low parasitemia noted in our malnourished children. Lastly it remains a matter of speculation whether fatty infiltration of liver seen in acute PEM⁶, could adversely influence the preerythrocytic phase of development of plasmodia.

However, whatever the pathogenesis of low parasitemia in PEM the question that worries is, will the improvement in nutritional status make children more prone to complicated forms of malaria?

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