Table 1: Correlation among the parameters in the second trimester

	Iron	Total protein	Albumin	Globulin	PCV	Hb
Iron (*P* value)		<0.001*	<0.001*	0.216 ns	0.714 ns	0.968 ns
R^2		0.140	0.183	0.023	0.002	0.001
Total protein	<0.001*	-	0.041*	<0.001*	0.341 ns	0.178 ns
	0.140		0.057	0.197	0.013	0.026
Albumin	<0.001*	0.041*	-	<0.001*	<0.001*	0.002*
	0.183	0.057		0.556	0.139	0.133
Globulin	0.216 ns	<0.001*	<0.001*	-	<0.001*	<0.001*
	0.023	0.197	0.556		0.214	0.224
PCV	0.714 ns	0.341 ns	<0.001*	<0.001*	-	<0.001*
	0.002	0.013	0.139	0.214		0.932
Hb	0.968 ns	0.178 ns	0.002*	<0.001*	<0.001*	-
	0.001	0.026	0.133	0.224	0.932	

*Significant, ns=not significant. This shows a strong correlation between serum iron and total proteins and albumin (*P*<0.001) but not serum globulin, PCV or Hb (*P*=0.216; 0.714 and 0.968 respectively)

Table 2: Correlation among the parameters in the third trimester

	Iron	Total protein	Albumin	Globulin	PCV	Hb
Iron (*P* value)		0.456 ns	0.003*	0.297 ns	0.128 ns	0.241 ns
R^2		0.006	0.085	0.011	0.024	0.014
Total protein	0.456 ns	-	<0.001*	<0.001*	<0.001*	<0.001*
	0.006		0.124	0.330	0.174	0.159
Albumin	0.003*	<0.001*	-	<0.001*	<0.001*	0.005*
	0.085	0.124		0.183	0.120	0.079
Globulin	0.297 ns	<0.001*	<0.001*	-	0.909 ns	<0.421 ns
	0.011	0.330	0.183		0.001	0.006
PCV	0.128 ns	<0.001*	<0.001*	0.909 ns	-	<0.001*
	0.024	0.174	0.120	0.001		0.790
Hb	0.241 ns	0.001*	0.005*	<0.421 ns	<0.001*	-
	0.014	0.159	0.079	0.006	0.790	

*Significant, ns=not significant. Serum iron correlated with albumin only (*P*=0.004), total protein with all (*P*<0.001) except serum iron (*P*=0.456) and serum albumin with all other parameters (*P*=0.005)

Table 3: Correlation among the parameters in control subjects

	Iron	Total protein	Albumin	Globulin	PCV	Hb
Iron (*P* value)		0.168 ns	0.115 ns	0.751 ns	0.041*	0.017*
R^2		0.033	0.042	0.001	0.070	0.094
Total protein	0.168 ns	-	0.010*	<0.001*	0.606 ns	0.737 ns
	0.033		0.109	0.307	0.005	0.002
Albumin	0.115 ns	0.010*	-	<0.001*	0.930 ns	0.143 ns
	0.042	0.109		0.331	<0.001	0.037
Globulin	0.751 ns	<0.001*	<0.001*	-	0.911 ns	0.357 ns
	0.001	0.307	0.331		<0.001	0.015
PCV	0.041*	0.606 ns	0.930 ns	0.911 ns	-	<0.001*
	0.070	0.005	<0.001	<0.001		0.644
Hb	0.017*	0.737 ns	0.143 ns	0.357 ns	<0.001*	-
	0.094	0.002	0.037	0.015	0.644	

*Significant, ns=not significant. Correlations were not significantly evident among most parameters

cells, as well as suppression of production of pro-inflammatory cytokines such as interleukin-12 (IL-12), tumor necrosis factor-α (TNF-α) and interferon–γ (IFN-γ). These alterations to the immune status of pregnant women are required to enable mothers tolerate genetically different fetal tissues during pregnancy, but may also increase susceptibility of women to infections.[26] These alterations may have accounted for the initial non-significant reduction of serum globulin during the second trimesters and as the pregnancy progressed.

Decreases in packed cell volume and hemoglobin are consequences of decreases in serum iron and albumin. While

iron store determines, to a large extent, the level of hemoglobin, protein level is one of the determinants of the value of packed cell volume. Thus, while serum iron and albumin need to be improved to increase packed cell volume and hemoglobin – to prevent anemia, globulin is particularly significant in its role as immune protein – to prevent immune-related complications including infections and infestations. Though the development of immunity, especially against malaria, is said to increase with parity,[27-29] low serum globulin and therefore, low immunity is a threat to primigravidae and secundigravidae.

This study has re-awakened our consciousness on the magnitude of maternal malnutrition in our rural areas. However, identifying the women before pregnancy and longitudinally following them throughout pregnancy would have been more appropriate. Furthermore, a 24 h dietary recall may not yield an accurate representation of the nutrient status and preferably, dietary recall for a month is more valuable. This is, however, difficult to achieve as most of the women may not be able to recall the exact food they took during the past one month. These short comings will be taken care of in future studies.

It is less than half a decade to the MDGs and maternal nutritional indices are not encouraging. Maternal/perinatal morbidity and mortality has remained unacceptably high, and it is patently obvious that the attainability of the MDGs is questionable. Regrettably, no concerted effort seems to be in place either by the government or the nongovernmental agencies. All energies and resources have been channeled into HIV/AIDs prevention and treatment with minimal input on the prevention of maternal malnutrition. This calls for desperate measures to improve the appalling situation, especially in the rural areas. This will include not only improving the macronutrients but also the micronutrients, particularly antioxidant micronutrients known to ameliorate the effects of oxidative stress. There is also absolute need for periodic public health education in these areas to notify women on the need for early antenatal care and nutritional blueprint for intending and expectant mothers.

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