

Effect of micronutrient supplementation during altitude training on haematological and performance parameters of endurance athletes

**T.D.P. Nandadeva^{1*}, A.M.S.D.M. Dissanayake², S.D.I. Nanayakkara¹,
W.A.I.C. Silva¹ and A.A.J. Rajaratne¹**

¹*Department of Physiology, Faculty of Medicine, University of Peradeniya, Sri Lanka,* ²*Department of Pathology, Faculty of Medicine, University of Peradeniya, Sri Lanka*

**damsara@gmail.com*

The effects of various altitude training models on different parameters in endurance athletes have been studied by many researchers. However, the results of these studies are inconsistent. The present study was carried out to determine whether living at an altitude of 2200 m and training at an altitude of 1800 m for 4 to 5 weeks will have an effect on haematological and performance parameters of endurance athletes and to determine the effect of nutritional supplementation during altitude training on the above parameters.

Long distance male athletes of Sri Lanka Army participating at national level competitions were included in the study. They underwent an altitude training protocol for 30-34 days living at 2200 m and training at 1800 m. Seven subjects were given iron and vitamin supplements (WI group), 6 subjects were not (WOI group). Blood samples were obtained for assessment of haematological parameters, and maximal oxygen consumption (VO₂max) was determined using a submaximal exercise test on the day of ascending to the altitude and within 2 weeks of descending from the altitude.

The mean haemoglobin concentration (Hb) increased significantly only in WI group (p=0.02). The mean corpuscular haemoglobin and mean corpuscular haemoglobin concentration significantly increased in both groups (WI, p=0.008 and 0.001; WOI, p=0.02 and 0.03 respectively), while the mean cell volume significantly increased in only the WOI group (p=0.03). The red cell distribution width (RDW) significantly decreased (p=0.013) in WI and significantly increased in WOI (p=0.046). No significant changes in the serum ferritin level and VO₂max were seen in either group.

Results indicate that Hb increases by 4.2% in endurance athletes with 4-5 weeks of living and training at a moderate altitude when nutritional supplementation is given; and non-supplemented athletes have a tendency to develop an iron deficiency as indicated by increased RDW. Change in VO₂max may not have been observed because the training altitude was higher than the recommended altitude (<1500 m) in a “live high train low” model and, therefore, adequate training intensity could not be maintained.

In conclusion, this study shows that nutritional supplementation is essential for endurance athletes undergoing altitude training to produce a substantial erythropoietic response as well as to prevent development of iron deficiency.

Financial assistance given through University Research Grant (RG/2014/28/M) is acknowledged.