Abstract

Introduction Haemoglobinopathies are known to cause anaemia which has devastating consequences for the children's development. Haemoglobin E is very common in Cambodia. However, the symptoms are often not severe and the mutation might therefore not be detected. Anaemia caused by haemoglobin E is due to disturbances in erythropoiesis. β-thalassemia also leads to anaemia and an increased uptake of iron from the intestines. At present it is uncertain if haemoglobin E also leads to an increased iron uptake.

Objective The overall objective of this study was to assess the impact of haemoglobin E on iron status and uptake of iron received from fortified rice in school children 5-14 years of age in Kampong Speu province, Cambodia.

Method The study used data from FORISCA, a large cluster randomized, double blinded, placebo-controlled effectiveness study. 16 schools in Kampong Speu province, Cambodia, all part of WFP's school meal program, were randomized to receive one of four different types of rice. Four additional schools that were not part of the school meal program had the function of control group. Three data collections took place during the school year throughout which the children ate the rice. For this study two of the four groups receiving rice were included. This resulted in a total of 980 children included in the analyses. Blood samples were taken at all three data collections.

Results A prevalence of 45.65% of haemoglobin E were found among the children. The presence of haemoglobin E decreased the haemoglobin concentration considerably. Neither the serum ferritin concentration nor the serum transferrin receptor concentration was shown to be correlated with haemoglobin E. The serum hepcidin concentration was elevated in children with haemoglobin E compared to children without haemoglobin E. No difference was seen in the effect of the fortified rice on haemoglobin, serum ferritin or serum transferrin receptor concentration between children with and without haemoglobin E respectively.

Conclusion No effect was seen of the fortified rice on the iron status of the children. Because the serum hepcidin concentration is elevated despite a lower concentration of haemoglobin in the children with haemoglobin E, haemoglobin E seems to alter the signalling of the iron metabolism.