

TropEd Masters Programme in International Health

A rapid appraisal on anemia prevalence and major hematological indices among school-aged children in rural area, Northern China

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ABSTRACT

Background: Anemia, mostly caused by iron deficiency, is one of the most prevalent nutritional disorders in China, but little is known about the current situation in school-aged children in rural area.

Objective: To measure anemia prevalence as well as to evaluate the main hematological indices among school-aged children in Beipiao County, a rural area in Northern China.

Design: A randomized stratified cluster sampling method was used and 4060 children aged 7-14 years were selected. A questionnaire was administered for basic information including a general exam. Capillary blood was collected and analyzed with the electronic blood counter. Main hematological measures such as hemoglobin concentration, red blood cell counts, and mean cell volume value, were compared with the WHO reference values. Anemia prevalence rate and the proportion of children with microcytosis were calculated with different age-sex-specific cutoff values.

Results: Beipiao children were found to have a higher mean RBC counts ($4.94 \pm 0.45 \times 10^{12}/L$) and higher HB concentration ($143 \pm 11g/L$), than the WHO reference values, but lower MCV value (80.0 ± 3.2 fl). 62 out of 4037 children were diagnosed with anemia, with a general anemia prevalence rate of 1.5%. This anemia prevalence rate is quite lower than other studies in China. All anemic children, except one girl, were of mild anemia with HB concentration between 90g/L to 119g/L. The age-sex-specific anemia prevalence rate was 1.3% in 5-7yr group, 1.3% in 8-11yr group, and 2.7% in 12-14yr group for boys ($p > 0.05$), and 0.0%, 1.3% and 1.5% for girls ($p > 0.05$), respectively. 1978 children were diagnosed as having microcytosis with the proportion of 48.9%. The age-sex-specific microcytosis proportion was 71.6%, 52.0%, and 63.8% among boy groups, and 45.5%, 39.3%, and 47.0% among girl groups. The anemia proportion among the children with microcytosis was 1.8%, which is similar to the general anemia proportion ($p > 0.05$).

Conclusions: Increased HB concentration can be present concurrently with decreased MCV value in children, which has not been reported before. Little is known about the possible factors for this abnormal hematological pattern. Extensive use of iron pots for cooking in Beipiao is assumed to produce a long-term high dietary iron intake and therefore to some extent affecting the synthesis of hemoglobin and morphology of red blood cell.

Keywords: anemia, hemoglobin, MCV, iron absorption, dietary iron regulation, iron pot, school-aged children, Northern China