Anthelmintic treatment and haemoglobin concentrations during pregnancy

H Torlesse, M Hodges

A longitudinal study was conducted in Sierra Leone to measure the impact of a single dose anthelmintic (400 mg albendazole) and daily iron-folate supplements (36 g iron and 5 mg folate) on haemoglobin (HG) concentration during pregnancy. After controlling for baseline Hb concentration and season, the mean benefit of anthelmintic treatment, relative to the control, on the change in haemoglobin concentration between baseline and the third trimester was 6·6 g/L Hb (p=0·0034). The corresponding value for iron-folate supplements was 13·7 g/L Hb (p<0·0001). These findings indicate that anthelmintic treatment should be included in strategies to control maternal anaemia in Sierra Leone.

In developing countries, the health of pregnant women is frequently affected by parasitic infections and anaemia. Intestinal helminth infections may contribute to anaemia by causing blood loss and by affecting the supply of nutrients necessary for erythropoiesis. Hookworm infections are the leading cause of pathological blood loss in tropical and sub-tropical regions. Since anaemia poses a serious threat to the health of mothers and fetuses, WHO recommends that anthelmintic treatment be used in areas where hookworms are endemic and anaemia is prevalent. Few countries have integrated anthelmintic treatment into maternal-anemia control programmes. This situation might be improved if the anthelmintic intervention to control maternal anaemia was shown to be effective.

As part of a randomised placebo-controlled field trial in western Sierra Leone, we investigated the impact of a single course of anthelmintic (400 mg albendazole) and daily iron and folate supplements (36 g iron and 5 mg folate) on haemoglobin and serum ferritin concentrations during pregnancy. Ethics clearance was granted by the Ministry of Health, Sierra Leone. We used a factorial design to compare the two interventions with each other and with controls simultaneously. We took baseline measurements in the first trimester of pregnancy, and started treatment at the first antenatal visit in the second trimester. Follow-up measurements were taken in the third trimester. Haemoglobin was measured with a portable haemoglobin photometer (Hemo Cue, Angelholm, Sweden) and serum ferritin concentrations during pregnancy. The implications for public-health policy in other antenatal populations will depend on the local epidemiology of intestinal nematode infections, and on the extent of underlying maternal iron deficiency and anaemia.

As part of the study, 184 women were aged 15–40 years, gravidity 1–11. 59 (32%) women were lost to follow-up, including eight (4·3%) who were withdrawn from the study because of severe anaemia (haemoglobin <80 g/L). At baseline, the frequency of intestinal helminth infections was: Ascaris lumbricoides 21·1%, Necator americanus 66·5%, and Trichuris trichiura 71·9%. Anaemia (haemoglobin <110 g/L) was diagnosed in 108 (58·7%) women and associated with iron deficiency (ferritin <20 µg/L) in 39 (21·2%) women.

The haemoglobin and serum ferritin concentrations of pregnant women who received anthelmintic treatment and iron and folate supplements did not change significantly between baseline and the third trimester. However, these values decreased significantly in women treated with anthelmintics alone or iron-folate supplements alone, or with neither intervention. After controlling for baseline haemoglobin concentration and season, haemoglobin fell by 6·6 g/L (p=0·0034) in anthelmintic-treated women, and by 13·7 g/L (p<0·0001) in iron and folate-treated women compared with controls. Mean haemoglobin concentration at baseline and at follow-up in the third trimester for each intervention group is shown in the tables. The effects of anthelmintic treatment and iron and folate supplements were additive. Serum ferritin concentrations fell by significantly less in women who received iron and folate supplements than in controls (p<0·0001). Anthelmintic treatment did not seem to affect change from baseline serum ferritin concentration (p=0·76), which may indicate that iron savings associated with treatment were not sufficient to allow net storage of iron.

Mean (SD) haemoglobin concentration of pregnant women in Sierra Leone at baseline and at follow-up in the third trimester following intervention with albendazole and/or iron-folate supplements

<table>
<thead>
<tr>
<th>Intervention groups</th>
<th>Haemoglobin (g/L)</th>
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<tbody>
<tr>
<td></td>
<td>FeA (n=52)</td>
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<tr>
<td>Baseline</td>
<td>108·0 (11·8)</td>
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<tr>
<td>Third trimester</td>
<td>107·3 (14·3)</td>
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</tbody>
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Fe=iron-folate; C=iron folate control; A=albendazole; C,A=albendazole control.

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