



Causes of anaemia in pregnant women living in camps for displaced persons along the Thai-Myanmar border

V.I. Carrara, C. Turner, P. Singhasivanon, R. McGready, F. Nosten

Mahidol Oxford University Research Unit

Anaemia: possible causes in refugees

Nutritional:

- Iron deficiency: intake limited to fish paste & enriched flour
- B12 deficiency: little animal protein intake

Parasitic:

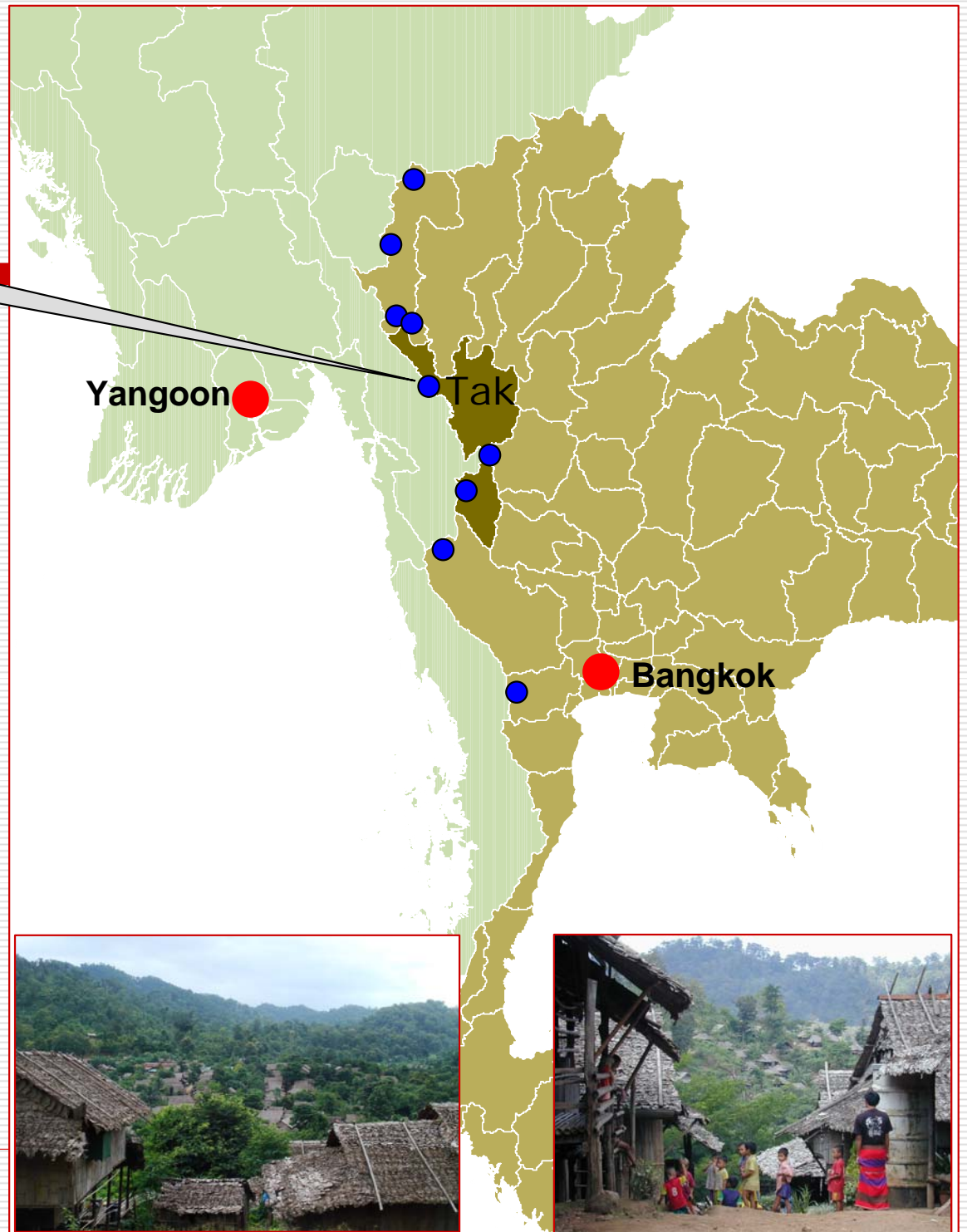
- Malaria: but dramatic reduction (EDT with ACT)
- Intestinal parasites: 2007 X-sectional survey
60.2% pregnant women infected (of whom 45.5% had hookworms)

Haemoglobinopathies: prevalence unknown

Repeated pregnancies

Mae La camp

- The largest camp (~40,000 people)
- Food provided monthly by TBBC (~2270kcal/day)
- Extra 500 kcal/day during pregnancy (beans, canned sardines, oil)



Antenatal Care in Mae La camp

- > 90% of pregnant women attend ANC
 - 17% are adolescents (< 20years old)
 - 12% are grand multipara (> 4 births)
 - 78% register at 1st trimester
 - Average ANC visits: 18 weeks
 - Daily supplement of ferrous sulfate 200mg and weekly supplement of folic acid 5mg
 - Regular control of haematocrit and malaria check
 - Weekly extra food ration
-

Objectives

- ❑ To investigate the causes of anaemia among pregnant women
 - ❑ To improve/adjust the anaemia treatment guidelines
-

Methods

- May-Sep 2007, during routine ANC
 - Pregnant women with 2 consecutive haematocrit < 30% were asked for:
 - Stool test
 - Complete blood cell count
 - Serum ferritin
 - G6PD deficiency test
 - Haemoglobin electrophoresis
-

Results

1,195 pregnant women with Hct test performed



188 pregnant women confirmed Hct < 30% (16%)



152 (81%) complete set of investigations

Baseline characteristics

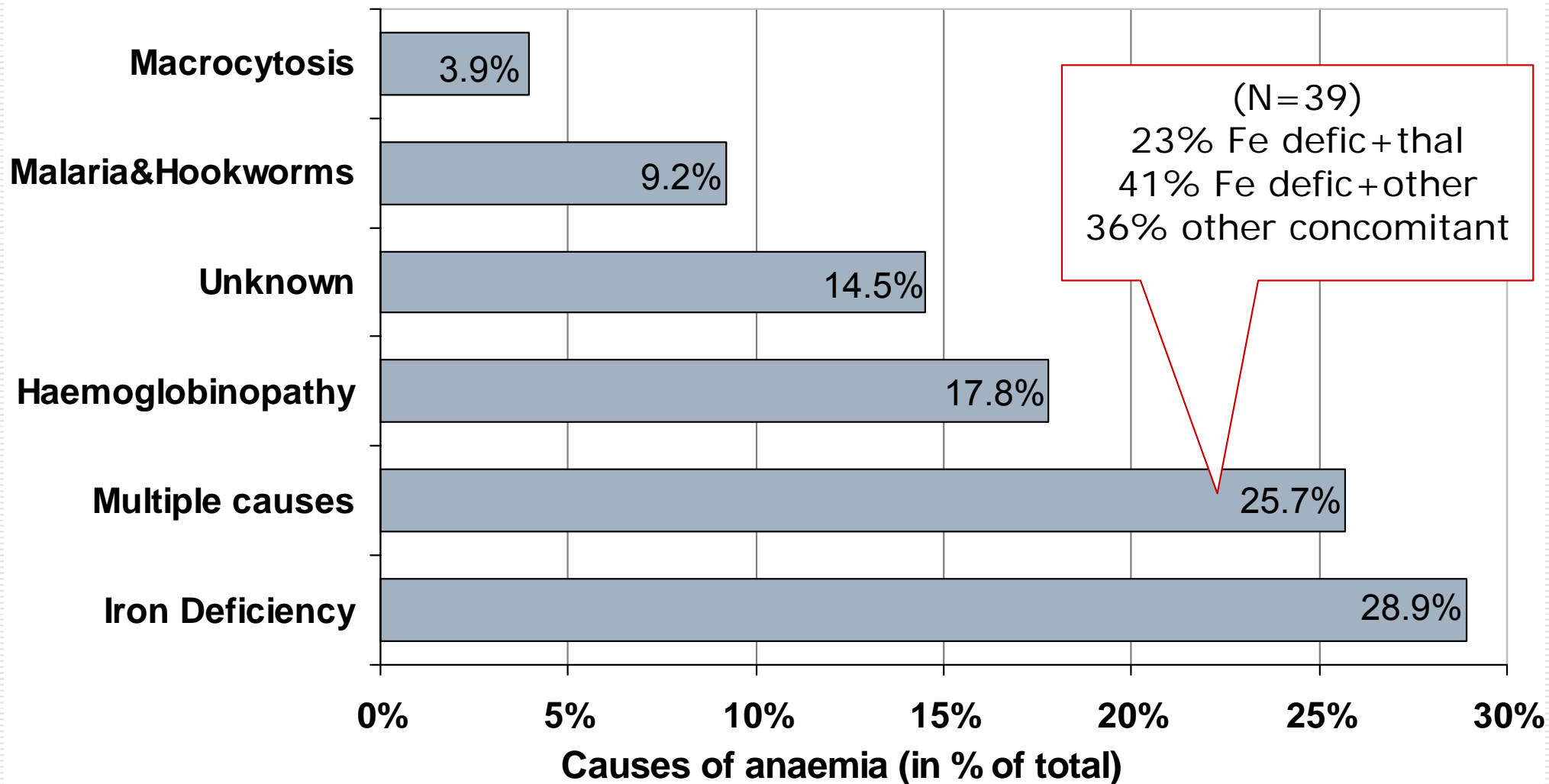
Age (in years) ^a	28 (7.1) [16-46]
Adolescents (n, %)	23/152 (15%)
Primigravida (n, %)	30/152 (20%)
Gravida ^b	4 [1-10]
Parity ^b	2 [0-8]
Haematocrit (in %) ^b	27.0 [21.0-29.0]
- Mild/moderate anaemia (25.0-29.9%)	135/152 (88.8%)
- Severe anaemia (20.0-24.9%)	17/152 (11.2%)
EGA at 1 st anaemia episode (in weeks) ^a	20.6 (6.0) [8.2-38.5]

^a Mean value, (SD), [range]; ^b Median value, [range]

Investigations results

Iron deficiency (ferritin <30µg/l) - Severe iron depletion (<10µg/l)	69/152 (45%) 23/69 (33%)
Macrocytosis (MCV ≥95fL)	16/152 (10.5%)
Haemoglobinopathy (n, %) - β-thalassaemia trait	45/152 (30%) 34 (75.6%)
G6PD deficiency (n, %)	2/152 (1.3%)
Recent malaria episode (n, %)	16/152 (10.5%)
Worms (n, %) - Hookworms	80/152 (53%) 26/80 (33%)

Investigations results (cont.)



Investigations results (cont.)

□ Iron depletion:

- More likely if anaemia detected late in pregnancy (AR: 1.13 [1.04-1.22])
- Independent of worm or malaria infection
- Present in 20% (9/45) of women with haemoglobinopathy

□ Iron overload rare:

- 3 women with haemoglobinopathy
 - 4 women with acute recent infection (false +ve)
 - 2 unknown cause
-

Anaemia treatment

Ideally:

- ❑ 1 week supervised tx
- ❑ 11 continuous weeks unsupervised tx

Iron deficiency	Haemoglobinopathy macrocytosis
Ferrous sulfate 400mg BID Vit C 100 mg BID Folic acid 5 mg OD Vit B12 100 µg 2 BID	Ferrous sulfate 200mg OD Folic acid 5 mg OD Vit B12 100 µg 2 BID

Anaemia treatment (cont.)

In practice:

- 122/152 (80%) women had 1 wk supervised tx
 - 55 (45%) women increased their Hct $\geq 2\%$
 - 30 (25%) women increased their Hct 1-1.5%
 - 37 (30%) women had no change or a \downarrow of Hct
 - 78/122 (64%) had 12 weeks of tx
 - 53/78 (68%) continuous weeks
 - 32/122 (26%) delivered before end of tx
 - 12/122 (10%) lost
-

Anaemia treatment (cont.)

- 56/78 (72%) women had Hct \geq 30% at end of treatment
 - No difference in response between women with mild/moderate or severe anaemia on admission
 - Better response to treatment in “iron deficiency (alone or mixed) women” compared to women with haemoglobinopathy alone (Hct \geq 30%: 79% vs. 48%, $p = 0.035$)
-

Conclusions

- ❑ Anaemia: mostly mild to moderate
 - ❑ Mixed factors
 - ❑ Worm infection not directly linked with iron deficiency anaemia
 - ❑ Iron deficiency frequent despite routine prophylaxis: compliance? Absorption?
 - ❑ 2/3 of women will respond to 12 weeks tx
 - ❑ Women with haemoglobinopathy: ferritin test before tx
-

Thank you

