

Makanan pendamping asi yang optimal meningkatkan efek suplementasi zat besi terhadap status mikronutrien mikrobiota usus dan pertumbuhan anak myanmar usia 12-23 bulan a field randomized controlled trial = Optimized complementary feeding improves the effect of iron supplementation on micronutrient status gut microbiota and growth of 12-23 month old myanmar children a field randomized controlled trial

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Abstrak

[ABSTRAK

Anak di bawah dua tahun berisiko tinggi untuk defisiensi zat gizi mikro khususnya defisiensi zat besi, sebagian dikarenakan praktek pemberian makanan tambahan yang salah. Untuk meningkatkan kualitas pemberian makanan tambahan, rekomendasi makanan tambahan (Complementary Feeding Recommendation – CFR) berbasis pangan lokal dibutuhkan. Suplementasi zat besi digunakan secara luas untuk menanggulangi defisiensi zat besi di negara berkembang; namun, efek dari suplementasi tersebut pada mikronutrien lain dan pertumbuhan menjadi perhatian tersendiri. Fortifikasi zat besi telah menunjukkan dampak negatif pada mikrobiota usus melalui peningkatan pertumbuhan bakteri patogen pada usus dikarenakan peningkatan besi yang diserap dan suplementasi zat besi mungkin memiliki dampak yang serupa pada mikrobiota usus tetapi masih belum pernah diteliti. Sebaliknya, jika suplementasi zat besi diberikan dengan optimalisasi diet menggunakan CFR, status gizi anak-anak akan meningkat dengan efek samping yang lebih kecil pada mikronutrien lain dan pertumbuhan. Studi ini meneliti efek dari suplementasi zat besi; dengan atau tanpa diet optimal; pada status mikronutrien, mikrobiota usus dan pertumbuhan anak-anak Myanmar yang berusia di bawah 2 tahun. Sebuah percobaan acak terkontrol (NCT01758159) dilaksanakan selama 24 minggu pada anak usia 12-23 bulan di Ayeyarwady, Myanmar. Optimalisasi CFR berbasis pangan lokal dikembangkan dengan pendekatan Linear Programming. Pengacakan berdasarkan Desa untuk CFR dan non-CFR dan berdasarkan anak (n=433) untuk suplemen besi atau placebo, menghasilkan: 1. kelompok CFR+Fe (n=112); 2. kelompok CFR (n=112); 3. kelompok Fe (n=105); or 4. kelompok pembanding (plasebo) (n=104). Ibu dari kelompok CFR menerima pendidikan CFR dan anak-anak dari kelompok Fe menerima 15 mg Ferric NaEDTA setiap hari.

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ABSTRAK

Serum Feritin, Transferin receptor (sTfR), Zinc, retinol-binding-protein (RBP), C-reactive protein dan α-1 acid glycoprotein; feces untuk melihat mikrobiota usus (Bifidobacteria, Lactobacilli, Enterobacteriaceae, E.coli, EPEC, EAEC dan ETEC) diukur pada awal dan akhir penelitian. Di awal penelitian, 88.4% anak mengalami anemia (Hb<110g/L); setelah dikontrol dengan infeksi, 74.4% mengalami defisiensi zat besi (SF<12μg/L dan/ atau sTfR>8.3mg/L) dan 68.9% mengalami anemia gizi besi (AGB) (Hb<110g/L and ID), 41.3% mempunyai kadar serum Send rendah (serum send <10.7µmol/L). Suplementasi besi menurunkan anemia, defisiensi zat besi dan AGB dengan atau tanpa pemberian diet optimal. Namun, suplementasi besi meningkatkan risiko serum Send rendah dan pendek

(stunting) bila diberikan tanpa penambahan diet optimal. Efek samping ini tidak terlihat saat suplementasi tablet besi diberikan bersama dengan diet yang optimal. Tidak ada perbedaan yang nyata pada komposisi mikrobiota usus diantara semua kelompok. Suplementasi zat besi harus diberikan bersama dengan diet optimal untuk mengurangi efek samping baik pada kadar zat gizi mikro lainnya di dalam tubuh maupun pertumbuhan anak.; Children under 2-years of age are at high risk of micronutrient deficiencies especially iron deficiency (ID), partly due to poor complementary feeding practices.

To improve feeding practices, local food-based complementary feeding recommendations (CFR) are needed. Iron supplementation is widely used to treat ID in developing countries; however, its potential effects on other micronutrients and growth are of concern. Iron fortification had shown negative impact on gut microbiota with increased growth of gut pathogens due to increased unabsorbed iron. It was assumed that iron supplementation may have similar impact on gut microbiota but has not yet been explored. On the other hand, if iron supplementation is given with optimized diet using CFRs, nutritional status of children would be improved with less adverse effects on other micronutrients status and growth. The study investigated the effect of iron supplementation; given with or without optimized diet; on micronutrient status, gut microbiota and growth of under 2-year Myanmar children. A randomized controlled trial (NCT01758159) was conducted for 24 weeks among 12-23 month old children from Ayeyarwady, Myanmar. Optimized CFRs based on locally available foods were developed by Linear Programming approach. Randomization by village for CFRs or non-CFRs and by child (n=433) for iron supplements or placebo, created: 1.CFR+Fe (n=112); 2.CFR-alone (n=112); 3.Fe-alone (n=105); or 4.Placebo (n=104) groups. Mothers from CFR-groups received education on CFRs and children from Fe groups received 15mg Ferric NaEDTA daily. Serum for ferritin (SF), transferrin receptor (sTfR), zinc, retinol-binding-protein (RBP), C-reactive protein and α -1 acid glycoprotein; stool for gut microbiota (Bifidobacteria, Lactobacilli, Enterobacteriaceae, E.coli, EPEC, EAEC and ETEC) were measured at baseline and endline. At baseline, 88.4% of children were anemic (Hb<110g/L); after adjusting for infection, 74.4% had ID (SF<12 μ g/L and/or sTfR>8.3mg/L) 68.9% had iron deficiency-anemia (IDA) (Hb<110g/L and ID), and 41.3% had low serum zinc status (serum zinc <10.7 μ mol/L). Iron supplementation reduced anemia, ID and IDA whether or not it was given with optimized diet. However, iron supplementation increased the risk of low serum zinc and stunting when it is given without optimized diet. These adverse effects were not seen when iron supplementation was given with optimized diet. No significant difference was found in gut microbiota composition among groups. In conclusion, iron supplementation should be given together with optimized diet to reduce its adverse effect on other micronutrients status and growth to best improve nutritional status of these children., Children under 2-years of age are at high risk of micronutrient deficiencies especially iron deficiency (ID), partly due to poor complementary feeding practices. To improve feeding practices, local food-based complementary feeding recommendations (CFR) are needed. Iron supplementation is widely used to treat ID

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