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**Figure S1. Design of the antenatal phase of the trial.** FeFol, iron folic acid; MMN, multiple micronutrients and PE, protein energy.

**Table S1. Nutritional composition of the allocated daily intake of pregnancy supplements**

|  |  |  |
| --- | --- | --- |
|  | **Tablets** | **LNS** |
| **Nutrients** | **FeFol** | **MMN** | **PE** | **PE + MMN** |
| Iron (mg) | 60 | 60 | 60 | 60 |
| Folate (μg) | 400 | 400 | 400 | 400 |
| Vitamin A (RE μg) |  | 1600 | *2.85* | 1600 |
| Vitamin D (IU) |  | 400 | *-* | 400 |
| Vitamin E (mg) |  | 20 | *4.2* | 20 |
| Vitamin C (mg) |  | 140 | *2.25* | 140 |
| Vitamin B1 (mg) |  | 2.8 | *0.3* | 2.8 |
| Vitamin B2 (mg) |  | 2.8 | *0.45* | 2.8 |
| Niacin (mg) |  | 36 | *1.35* | 36 |
| Vitamin B6 (mg) |  | 2.8 | *0.15* | 2.8 |
| Vitamin B12 (μg) |  | 5.2 | *0.1* | 5.2 |
| Zinc (mg) |  | 30 | *3.3* | 30 |
| Copper (mg) |  | 4 | *1.05* | 4 |
| Selenium (μg) |  | 130 | *6.15* | 130 |
| Iodine (μg) |  | 300 | *2.6* | 300 |
| Energy (kcal) |  |  | 746 | 746 |
| Protein (g) |  |  | 20.8 | 20.8 |
| Lipids (g) |  |  | 52.6 | 52.6 |

FeFol, iron folic acid; MMN, multiple micronutrients; PE, protein energy; LNS, lipid-based nutrient supplement.

Data in italics represent natural micronutrients content in PE which is made from the food base ingredients.

**Table S2. Mean diphtheria, tetanus and pertussis antibody titres in infants at 12 and 24 weeks of age by season of mid-gestation and first DTP vaccination**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Season of mid-gestation** |  | **Season of vaccination** |
|  | **Unadjusted models** |  | **Unadjusted models** |
| **Vaccine** | **Dry/Harvest** **(n = 335)** | **Rainy/Hungry** **(n = 375)** | **Effect size (95%CI)a** | ***p-valueb*** |  | **Dry/Harvest** **(n = 486)** | **Rainy/Hungry** **(n = 224)** | **Effect size (95%CI)a** | ***p-valueb*** |
| **12 weeks** |  |  |  |  |  |  |  |  |  |
| Diphtheria | 0.19 (0.15, 0.24) | 0.08 (0.07, 0.10) | 35.6 (23.7, 47.5) | **<0.001** |  | 0.09 (0.08, 0.10) | 0.26 (0.20, 0.35) | -48.1 (-60.7, -35.4) | **<0.001** |
| Tetanus | 0.74 (0.67, 0.82) | 0.55 (0.50, 0.61) | 12.6 (6.4, 18.7) | **<0.001** |  | 0.58 (0.53, 0.63) | 0.78 (0.69, 0.88) | -13.2 (-19.8, -6.6) | **<0.001** |
| Pertussis | 6.3 (5.5, 7.1) | 4.9 (4.3, 5.6) | 10.9 (3.2, 18.7) | **0.006** |  | 4.9 (4.4, 5.5) | 7.1 (6.1, 8.2) | -16.3 (-24.5, -8.0) | **<0.001** |
| **24 weeks** |  |  |  |  |  |  |  |  |  |
| Diphtheria | 1.2 (1, 1.3) | 1.6 (1.5, 1.8) | -14.7 (-21.2, -8.1) | **<0.001** |  | 1.6 (1.5, 1.7) | 1.0 (0.86, 1.2) | 19.6 (12.6, 26.7) | **<0.001** |
| Tetanus | 3.7 (3.2, 4.3) | 3.8 (3.4, 4.2) | -1.0 (-8.8, 6.7) | 0.791 |  | 3.8 (3.5, 4.2) | 3.9 (3.2, 4.7) | -1.1 (-9.3, 7.2) | 0.800 |
| Pertussis | 106.2 (86.2, 130.7) | 82.8 (67.5, 101.5) | 10.8 (-1.9, 23.5) | 0.094 |  | 91.6 (76.6, 109.7) | 92.6 (71.7, 119.4) | -0.40 (-14.1, 13.3) | 0.950 |

aEffect sizes were determined using the mean difference between the dry season and rainy season of vaccination from the Student’s *t-*test and were expressed as percentages (%).

bThe p-values were calculated by Student’s *t*-test on the log-transformed antibody concentrations.

**Table S3. Percentage (n (%)) of infants with protective antibody levels against diphtheria, tetanus and pertussis at 12 and 24 weeks of age by mid-gestation and vaccination seasons**

|  |  |  |
| --- | --- | --- |
|  | **Mid-gestation season** | **Vaccination season** |
| **Vaccinea** | **Dry/Harvest** **(Nov-May) (n = 335)** | **Rainy/Hungry** **(Jun-Oct) (n = 375)** | ***p-valueb*** | **Dry/Harvest** **(Nov-May) (n = 486)** | **Rainy/Hungry** **(Jun-Oct) (n = 224)** | ***p-valueb*** |
| **12 weeks** |  |  |  |  |  |  |
| Diphtheria | 211 (63.0) | 183 (48.8) | **<0.001** | 244 (50.2) | 150 (67.0) | **<0.001** |
| Tetanus | 3331 (98.8) | 360 (96.0) | **0.021** | 470 (96.7) | 221 (98.7) | 0.134 |
| Pertussis | 207 (61.8) | 199 (53.1) | **0.019** | 253 (52.1) | 153 (68.3) | **<0.001** |
| **24 weeks** |  |  |  |  |  |  |
| Diphtheria | 285 (93.8) | 337 (99.7) | **<0.001** | 435 (99.5) | 187 (91.2) | **<0.001** |
| Tetanus | 302 (99.3) | 337 (99.7) | 0.502 | 436 (99.8) | 203 (99.0) | 0.196 |
| Pertussis | 277 (91.1) | 298 (88.2) | 0.222 | 390 (89.2) | 185 (90.2) | 0.699 |

aPresenting protective antibody levels and therefore being respondent to the vaccine was defined as having an antibody titre >0.1 IU/mL for diphtheria and tetanus, according to international standards (WHO). An arbitrary threshold was established at >5.0 EU/mL as for pertussis an in-house antibody assay was used.

bThe p-values were calculated by Student’s *t*-test.



**Figure S2. Comparisons of mean concentrations (95% confidence intervals) of diphtheria, tetanus and pertussis antibodies by season of vaccination and maternal nutritional supplementation groups.** Antibody titres were measured at 12 weeks after a single dose of DTP vaccines and at 24 weeks after three doses of the vaccines. Means were adjusted with maternal variables; supplement group, compliance to supplement, age, haemoglobin levels, formal education, morbidity, and BMI, and with infant variables; gestational age at delivery, sex, WLZ at 8 weeks of age, haemoglobin levels at 12 weeks, morbidity, exclusively breastfed, birth season and Fourier terms of month of mid-gestation or first vaccination. For the 24 weeks data, means were adjusted with the same factors mentioned above with changes for: infant WLZ at 16 weeks, haemoglobin levels at 24 weeks, morbidity and exclusively breastfed from birth to 24 weeks. Means were back-transformed from the log-scale and expressed in IU/ml for diphtheria and tetanus antibody titres and in EU/ml for pertussis antibody titres. P-values were calculated by t-test for each comparison.

Abbreviations: Iron folic-acid (reference); MMN, multiple micronutrient; PE, protein-energy, PE+MMN, protein energy combined with multiple micronutrients.