# **Supplementary file**

**Table S1**. Association of nutritional and health status markers with total PUFA and specific n-6 fatty acids using whole-blood in children with acute malnutrition (Regression coefficients (*β*) and 95 % confidence intervals adjusted for age, gender and breastfeeding)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Total PUFA**† | | **n-6 polyunsaturated fatty acids** | | | | | | | | | | | |
|  | **LA**† | |  | **AA**† | |  | **n-6 LCPUFA**† | |  | **Mead acid:AA**‡† | |
| *β* | 95% CI |  | *β* | 95% CI |  | *β* | 95% CI |  | *β* | 95% CI |  | *β* | 95% CI |
| **Nutritional status** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WAZ, z-score(*n* 146)a | 0•37 | -0•36, 1•10 |  | 0•24 | -0•29, 0•78 |  | 0•08 | -0•17, 0•33 |  | 0•10 | -0•20, 0•41 |  | -1•56 | -6•09, 2•97 |
| Body weight, kg (*n* 168) | 0•27 | -0•01, 0•54 |  | 0•15 | -0•05, 0•35 |  | 0•09 | -0•01, 0•19 |  | 0•11 | -0•01, 0•23 |  | -0•38 | -1•99, 1•23 |
| MUAC, cm (*n* 168) | 0•26 | -0•33, 0•85 |  | 0•04 | -0•39, 0•46 |  | 0•19 | 0•01, 0•40 |  | 0•23 | -0•02, 0•48 |  | -2•86 | -6•22, 0•50 |
| **Health status** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Anaemia (yes *v.* no) (*n* 165)a | -0•65 | -1•79, 0•49 |  | -0•46 | -1•29, 0•36 |  | -0•11 | -0•51, 0•29 |  | -0•13 | -0•61, 0•36 |  | 5•35 | -1•18, 11•89 |
| HbE Heterozygote (yes *v.* no) (*n* 105) | -0•66 | -2•30, 0•98 |  | -0•50 | -1•73, 0•74 |  | -0•16 | -0•79, 0•47 |  | -0•11 | -0•86, 0•64 |  | 4•86 | -5•14, 14•86 |
| Inflammation markers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CRP > 5 mg/L, (y/n) (*n* 159) | 0•89 | -0•65, 2•42 |  | 0•39 | -0•70,1•49 |  | 0•42 | -0•12, 0•97 |  | 0•48 | -0•19, 1•15 |  | -1•47 | -9•65, 6•72 |
| AGP > 1 g/L, (y/n) (*n* 159) | -0•53 | -1•73, 0•67 |  | -0•44 | -1•29, 0•42 |  | -0•10 | -0•54, 0•32 |  | -0•00 | -0•65, 0•41 |  | 5•41 | -0•95, 11•78 |
| Inflammation, (y/n) (*n* 159)b | 0•11 | -1•65, 1•86 |  | -0•17 | -1•42, 1•08 |  | -0•11 | -0•54, 0•32 |  | 0•31 | -0•46, 1•07 |  | -0•73 | -10•06, 8•60 |
| Blood count |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Eosinophils, x1012/L (*n* 165) | 26 | -15, 21 |  | -3 | -100, 95•0 |  | 17 | -30, 64 |  | 21 | -37, 78 |  | -115 | -424, 194 |

Abbreviations: PUFA; polyunsaturated fatty acids, LA, linoleic acid; AA, arachidonic acids; LCPUFA; long-chain polyunsaturated fatty acids; WAZ, weight-for-age; MUAC, mid-upper-arm-circumferences; CRP; C-reactive protein, AGP; α1-acid glycoprotein.

aAdjusted for breastfeeding only.

bDefined as CRP > 5 mg/L and AGP > 1 g/L.

†Blood counts results only, are given as PUFA×10-4, LA and AA×103, n-6 LCPUFA×102 and Mead acid/AA ratio×10-2 to present meaningful results.

‡For nutritional status and health status markers results (expect blood counts) are given as ×103 to present meaningful result.

\**P*<0•05.

**Table S2**. Association of nutritional and health status markers with specific n-3 fatty acids using whole-blood in children with acute malnutrition (Regression coefficients (*β*) and 95 % confidence intervals adjusted for age, gender and breastfeeding)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **n-3 polyunsaturated fatty acids** | | | | | | | | | | |
| **EPA**†‡ | |  | **DHA**‡ | |  | **n-3 LCPUFA**†‡ | |  | **n-6 DPA:DHA**†‡ | |
| *β* | 95% CI |  | *β* | 95% CI |  | *β* | 95% CI |  | *β* | 95% CI |
| **Nutritional status** |  |  |  |  |  |  |  |  |  |  |  |
| WAZ, z-score(*n* 146)a | 9•0 | -1•0, 18•7 |  | 27•0 | -45•1, 99•1 |  | 11 | 84, 105 |  | -9•1 | -42•5, 24•3 |
| Body weight, kg (*n* 168) | 4•3 | 0•1, 8•4\* |  | 16•2 | -10•8, 43•3 |  | -0•1 | -38•4, 38•4 |  | -10•1 | -24•3, 4•1 |
| MUAC, cm (*n* 168) | 5•5 | -3•4, 14•35 |  | 36•9 | -20•1, 93•9 |  | 7•4 | -73•6, 88•4 |  | -7•5 | -37•7, 22•6 |
| **Health status** |  |  |  |  |  |  |  |  |  |  |  |
| Anaemia (yes *v.* no) (*n* 165)a | 5•7 | -11•5, 22•92 |  | -13•6 | -124, 97 |  | -6•3 | -22•1, 9•4 |  | 16•5 | -42•0, 75•1 |
| HbE Heterozygote (yes *v.* no) (*n* 105) | -10•6 | -36•8, 15•67 |  | -91 | -270, 88 |  | -9•0 | -29•3, 11•3 |  | 25•0 | -47•3, 97•3 |
| Inflammation markers |  |  |  |  |  |  |  |  |  |  |  |
| CRP > 5 mg/L, (y/n) (*n* 159) | 7•1 | -16•5, 30•70 |  | 48•1 | -103, 199 |  | 1•3 | -20•1, 22•8 |  | -16•8 | -97•6, 64•0 |
| AGP > 1 g/L, (y/n) (*n* 159) | 9•3 | -918, 28 |  | 12•9 | -106, 132 |  | 0•7 | -16•0, 17•7 |  | -12•7 | -76•1, 50•7 |
| Inflammation, (y/n) (*n* 159)b | 15•4 | -11•4, 42•15 |  | 21•6 | -151, 194 |  | -1•8 | -26•2, 22•7 |  | -53•4 | -145, 38 |
| Blood count |  |  |  |  |  |  |  |  |  |  |  |
| Eosinophil’s, x1012/L (*n* 165) | -16 | 1214, 1,183 |  | 1•4 | -11•7, 14•5 |  | 4•7 | -13•9, 23•3 |  | -20•7 | -373, 333 |

Abbreviations: EPA, Eicosapentaenoic acid; DHA, docosahexaenoic acid; LCPUFA; long-chain polyunsaturated fatty acids; DPA, docosapentaenoic acid; WAZ, weight-for-age; MUAC, mid-upper-arm-circumferences; CRP; C-reactive protein, AGP; α1-acid glycoprotein.

aAdjusted for breastfeeding only.

bDefined as CRP > 5 mg/L and AGP > 1 g/L.

§Blood counts results only, are totally given as EPA ×10-2, n-3 LCPUFA ×102, and n-6 DPA:DHA ×10-3 to present meaningful results.

‡For nutritional status and health status markers results (expect blood counts) are given as ×103 to present meaningful result.

\**P*<0•05.

**Table S3.** Comparison of CBC in children with SAM compared to children with MAM (mean and standard error adjusted for age and gender)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Acute malnutrition**a | | | | |
|  | SAM (*n* 101) | | MAM (*n* 63) | |  |
|  | Mean | SD | Mean | SD | *P*-values |
| RBC, x1012/L | 4•63 | 0•1 | 4•63 | 0•1 | 0•950 |
| Platelets, x109/L | 426 | 16 | 382 | 20 | 0•077 |
| WBC, x109/L | 12•3 | 0•4 | 11•7 | 0•5 | 0•357 |
| Neutrophils, x109/L | 0•61 | 0•0 | 0•6 | 0•0 | 0•564 |
| Lymphocytes, x109/L | 6•38 | 0•3 | 6•1 | 0•3 | 0•558 |
| Monocytes, x109/L | 0•84 | 0•1 | 0•9 | 0•1 | 0•533 |
| Eosinophil’s, x109/L | 0•32 | 0•0 | 0•3 | 0•1 | 0•938 |

Abbreviation: RBC, red blood cells; WBC, white blood cells; SAM, severe acute malnutrition; MAM, moderate acute malnutrition.

aSAM has been defined as either weight-for-height (WHZ) < -3 or mid-upper arm circumference (MUAC) < 115 mm and MAM as WHZ between -2 and -3 or MUAC 115-125 mm among children ≤ 59 months. Children ≥ 60 months SAM was defined as either a BMI-for-age (BAZ) < -3 or a MUAC children 5-9 years <129 mm, children 10-14 years <160 mm, children 15-18 years < 190 mm. MAM for children ≥ 60 months was defined as BAZ between -2 and -3 or MUAC children 5-9 years (129-154 mm), children 10-14 years (160-185 mm) and children 15-18 years (190-215 mm), respectively.