**Supplemental Tables and Figures**

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 **Table S1** Multiple Imputation listing

Number of Multiple Imputation Analysis values on MUAC, Weight & Height, Oedema and Diarrhoea



 **\*Treatment, Weight, Height and MUAC diarrhoea and oedema at baseline were used in the model as complete variables.**

 **Table S2** Daily feed Provision for children receiving standard feed (WHO) and legume-based feeds (LF)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **n/N (%) that Received any feed** | **Total N of****Deceased****Participants** | **γTotal N switched to WHO feed** | **n/N (%) Received fully prescribed feed** | **Chi-square****p-value** |
| Days | WHO | LF | WHO | LF | Legume Group only | WHO | LF |  |
| 0 | 80/80 (100) | **\***78/80 (97.5) | 0 | 0 | 0 | 61/80 (76.25) | 36/78(46.1) | <0.001 |
| 1 | **\*\***79/80(98.75) | ^78/80(97.5) | 0 | 0 | 1 | 72/79 (91.1) | 56/78(71.8) | 0.003 |
| 2 | 79/80(98.75) | **α**72/79(91.1) | 0 | 1 | 4 | 69/79(87.3) | 53/72(73.6) | 0.053 |
| 3 | 78/79(98.7) | 70/77(90.9) | 1 | 3 | 5 | 65/78(83.3 | 53/70(75.7) | 0.344 |
| 4 | **\*\*\***75/78(96.1) | 69/77(89.6) | 2 | 3 | 6 | 66/75(88.0) | 59/69(85.5) | 0.845 |
| 5 | **~** 73/78(93.6) | 68/77(88.3) | 2 | 3 | 7 | 65/73(89) | 56/68(82.35) | 0.370 |
| 6 | 73/78(93.6) | 68/76(89.5) | 2 | 4 | 7 | 64/73(87.7) | 51/68(75) | 0.085 |
| 7 | 70/74(94.6) | **β**66/75(88) | 2 | 5 | 6 | 60/70(85.7) | 49/66(74.2) | 0.144 |
| 8 | 62/66(93.9) | 55/65(84.6) | 2 | 5 | 7 | 47/62(75.8) | 43/55(78.2) | 0.933 |
| 9 | **#**50/55(90.9) | 52/62(83.8) | 2 | 5 | 6 | 41/50(77.4) | 40/52(76.9) | 0.697 |
| 10 | 43/48(89.5) | 45/55(81.8) | 3 | 5 | 6 | 34/43(79.1) | 35/46(76.1) | 1 |
| 11 | 35/40 (87.5) | 40/49(81.6) | 3 | 5 | 5 | 27/35(90) | 25/40(62.5) | 0.262 |
| 12 | 30/35(85.7) | 32/42(76.1) | 4 | 5 | 4 | 25/30(83.3) | 25/32(78.1) | 0.844 |
|  13 | 27/32 (84.3) | 31/42(73.8) | 4 | 5 | 5 | 22/27(81.5) | 23/31(74.2) | 0.728 |
|  14 | 24/29 (82.7) | 26/39(66.6) | 4 | 5 | 5 | 21/24(87.5) | 19/26(73.1) | 0.358 |
| Notes | **\***2 children refused feed on admission and one out of the two later on was started on F75 on day 1 and died the next day**\*\*** Child absconded from hospital\*\*\*2 Children absconded from hospital.**~** 1 child absconded.**#** 1child absconded.**^** 1 child absconded.**α** 1 child absconded.**β** 1 child absconded.γ The number varies with deaths occurring on children after they switched feeds. |

**Table S3.** Daily energy (in kilocalories) and protein (in grams) and proportion meeting target intakes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Median (IQR) of Energy Intake in Kcal** | **Median****(IQR) Intake of energy vs target %** | **Mann Whitney U****(p-value)** | **Median (IQR)****of Protein Intake in g** |  **Median of protein intake compared to target %** | **Mann Whitney U****(p-value)** |
| Days | WHO | LF | WHO | LF | Between Treatments | WHO | LF | WHO | LF | Between Treatments |
| 0 | 553.1 (208.13) | \*499.8 (235.2) | 100 (0) | 95.6(24.4) | <0.001 | 6.6(2.5) | 13.8(6.5) | 100(0) | 95.6(24.4) | <0.001 |
| 1 | \*\*563(225) | ^592.3 (214.8) | 100(0) | 100(2) | 0.002 | 6.8(2.7) | 16.5(6) | 100(0) | 100(2) | 0.002 |
| 2 | 585(247) | α609.6(203.6) | 100(0) | 100(1.2) | 0.007 | 6.8(2.7) | 16.8(8.3) | 100(0) | 100(1.2) | 0.007 |
| 3 | 660(267.75) | 643.1(363.7) | 100(0) | 100(0.5) | 0.171 | 13.1(16.2) | 17.7(10) | 100(0) | 100(0.5) | 0.171 |
| 4 | \*\*\*730(287) | 670.6(415.5) | 100(0) | 100(0) | 0.411 | 20.9(18.2) | 18.5(11.4) | 100(0) | 100(0) | 0.411 |
| 5 | ~780(376.7) | 713.2(303.3) | 100(0) | 100(0) | 0.138 | 22.6(19.5) | 19.6(8.4) | 100(0) | 100(0) | 0.138 |
| 6 | 810(337.5) | 731.5(397.7) | 100(0) | 100(0.9) | 0.063 | 23.5(10.5) | 20.2(10.9) | 100(0) | 100(0.9) | 0.064 |
| 7 | 840 (333.7) | β783.3(458.2) | 100(0) | 100(1.1) | 0.228 | 24.4(12.7) | 21.6(12.6) | 100(0) | 100(1.1) | 0.228 |
| 8 | 810(380.6) | 853(477.5) | 100(0.4) | 100(0) | 0.385 | 23.1(19.1) | 23.5(13.2) | 100(0.4) | 100(0) | 0.385 |
| 9 | #836.5(397) | 853.4(548.6) | 100(0) | 100(0) | 0.538 | 23.9(20.3) | 22.5(14.9) | 100(0) | 100(0) | 0.538 |
| 10 | 810(397) | 975.4(601) | 100(0) | 100(0) | 0.876 | 23.5(20.2) | 26.9(16.6) | 100(0) | 100(0) | 0.876 |
| 11 | 840(339) | 817.8(548.1) | 100(0) | 100(8) | 0.196 | 24.4(19.4) | 22.5(15.1) | 100(0) | 100(8) | 0.196 |
| 12 | 885(391.7) | 877.8(603.5) | 100(0) | 100(0) | 0.560 | 25.2(17.2) | 24.2(16.6) | 100(0) | 100(0) | 0.560 |
| 13 | 870(397) | 853.4(694.9) | 100(0) | 100(1) | 0.468 | 23.5(21) | 23.5(19.1) | 100(0) | 100(1) | 0.468 |
| 14 | 851(399.2) | 829(521.2) | 100(0) | 100(4) | 0.007 | 19.4(20.2) | 22.8(14.4) | 100(0) | 100(4) | 0.007 |
| Notes | **\***2 children refused feed on admission and one out of the two later on was started on F75 on day 5 up to day 12 of discharge.**\*\*** Child absconded from hospital.\*\*\*2 Children absconded from hospital.**~** 1 child absconded.**#** 1child absconded.**^** 1 child absconded.**α** 1 child absconded.**β** 1 child absconded. |

**Table S4** Mortality in children summarising underlying complications/conditions

|  |  |  |  |
| --- | --- | --- | --- |
| **Treatment** | WHO | LF | Comment |
| **Mortality All** | 12 | 11 |  |
| *Inpatient deaths* | 8 | 7 |  |
| *Major clinical syndrome associated with inpatient death* |
| Diarrhoea | 5 | 1 |  |
| LRTI | 1 | 4 |  |
| Sepsis other | 1 (Measles) | 1 (malaria) |  |
| Tuberculosis | 1 |  |  |
| Other  |  | 1  | Pancytopenia |
| Post discharge deaths | 4 | 4 |  |
| (HIV-related) | (3) | (1) |  |
| **Readmissions**  |  |  |  |
| Readmission and death | 2 | 1 |  |
| Readmission only | 2 | 1  |  |

**Post discharge deaths WHO arm**:

Readmission/death: 1 diarrhoea 1 sepsis; 2 deaths in community unknown

**Post discharge deaths Legume feed**:

Readmission/death 1 diarrhoea; Deaths in community: 1 diarrhoea, relapse of kwashiorkor, measles

 **Table S5 Baseline characteristics comparisons for WHO and legume feeds for intention to treat (ITT)**

**and per protocol (PP) analysis.**

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **By intenstionto treat**  | **Per-protocol Analysis** |
|  | **Legume feed** | **WHO feeds (F75/F100)** | **Legume feed** | **WHO feeds (F75/F100)** |
| Participants, n | 80 | 80 | 60 | 71 |
| Median age in months [Interquartile range) | 18 [12.7) | 17 [11.7] | 17 [12.2] | 17 [11.5] |
| Sex: Male (%) | 44 (55) | 39 (48.75) | 33 (51.6) | 34 (53.12) |
| **Nutritional status and history** |  |  |  |  |
| Median mid-upper arm circumference, cm [IQR] | 11.4[1.7] | 11.2 [1.7] | 11.4[1.32] | 11.2 [1.8] |
| Weight-for-height/length z score <-3 | 31 (39) | 39 (49) | 23 (38) | 39 (49) |
| Weight for height Z score [IQR] | -3.79 [1.7] | -4.08 [3] | -4.05 [1.57] | -4.19 [2.08] |
| Oedema (kwashiorkor) | 49 (61) | 41 (51) | 37 (62) | 39 (44) |
| Severe/generalized Oedema | 10/49 (20)  |  6/41 (15) | 6/37 (16)  |  6/39 (15) |
| Desquamation or flaky paint skin | 20/80 (25) | 15/80 (19) | 14/60 (23) | 16/71 (22.5) |
| Age when feeds introduced (months)  | 4 [3] | 5 [3] | 4 [3] | 5 [2.5] |
| Currently breast feeding | 21/80 (26.5) |  24/80 (30) | 15/60 (25) |  21/71 (30) |
| Previous admission with SAM | 5/80 (6) | 4/80 (5) | 4/60 (7) | 4/71 (6) |
| **Complications at Presentation** |  |  |  |  |
| History of fever  | 63/80 (79) | 57/80 (71) | 48/60 (80) | 50/71 (70) |
| Fever (axillary temp) > 37.5oC | 10/80 (12.5)  | 10/80 (12.5) | 9/60 (15)  | 8/71 (11) |
| Cough | 59/80 (74) |  59/80 (74) | 45/60 (75) |  54/71 (76) |
| Indrawing or deep breathing |  3/80 (4) | 3/80 (4) |  2/60 (3) | 3/71 (4) |
| Vomiting | 23/80 (29) | 25/80 (31) | 13/60 (22) | 30/71 (30) |
| Diarrhoea | 17/80 (21) |  25/80 (31) | 11/60 (18) |  19/71 (27) |
| **Laboratory parameters** |  |  |  |  |
| Hyponatraemia (<130 mmol/L) | 17/78 (22) | 13/80 (16) | 16/60 (27) | 11/71 (15.5) |
| Hypokalaemia (<3.0 mmol/L) | 9/78 (11.5) | 9/80 (11) | 6/60 (10) | 8/71 (11) |
| Hypoglycaemia (< 3mmol/dl) | 5/80 (6) | 1/80 (1) | 3/60 (5) | 0 |
| Severe anaemia (Hb < 5g.dl) | 2/78 (3) | 1/79 (1) | 1/60 (2) | 1/71 (1) |
| Lactate > 2 mmols/L | 39/68 (57) | 36/71 (51) | 22/60 (37) | 28/71 (39) |
| Malaria film positive | 15/80 (19) | 7/80 (9) | 12/60 (20) | 6/71 (8.5) |
| HIV Antibody positive | 1/80 (1) |  6 /80 (7.5) | 1/60 (2) |  5 /71 (7) |
| **Pre-existing Conditions /preadmission treatments** |
| Pulmonary Tuberculosis | 1/80 (1) | 2/80 (2.5) | 1/60 (2) | 2/71 (3) |
| Congenital Heart Disease |  0 | 0 |  0 | 0 |
| Cerebral Palsy/severe developmental delay | 6/80 (7.5) | 3/80 (4) | 4/60 (7) | 3/71 (4) |
| Currently taking antibiotics  | 25/80 (31) | 28/80 (35) | 19/60 (32) | 26/71 (37) |
| Currently taking antimalarials | 7/80 (9) | 9/80 (11) | 7/60 (12) | 7/71 (10) |
| Currently taking antiretrovirals | 1/80 (1) | 6/80 (7.5) | 1/60 (2) | 5/71 (7) |

Data are number (%) or median [interquartile range] unless otherwise specified.

**α ITT Analysis:** Primary outcome results assessed based on their assigned randomised treatment (N=80), ignoring non-compliance with respect to the therapeutic feed intake. **β PP Analysis:** Primary outcome results were assessed based on only the children.

**Table S6** Proportion of children achieving MUAC > 12.5cm at each time point and by study arm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| By intention to treat | Baseline | D7 | D28 | D90 |
|   |   |   |   |   |
| WHO | 13/80 (16.25%) | 12/78 (15.4%) | 26/71 (36.6%) | 43/68 (63.2%) |
|   |  |  |  |   |
| LF | 14/80 (17.5%) | 11/76 (14.5%) | 32/73 (44%) | 35/69 50.7%) |
|  |  |  |  |  |
| Per Protocol | Baseline | D7 | D28 | D90 |
|   |   |   |   |   |
| WHO | 13/80 (16.25%) | 12/78 (15.4%) | 26/71 (36.6%) | 43/68 (63.2%) |
|   |  |  |  |   |
| LF | 1/80 (17.5%) | 12/70 (17.0%) | 21/67 (31.1%) | 32/64 50%) |

**Figure S1** Status of children and length of hospital stay by study arm.

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Treatment | Status | N | Median | IQR |
| LEGUME | Absconded | 3 | 2 | 2.5 |
| LEGUME | Died | 6 | 6.5 | 4.75 |
| LEGUME | Discharged home | 71 | 12 | 8 |
| WHO | Absconded | 5 | 4 | 1 |
| WHO | Died | 8 | 13 | 9.5 |
| WHO | Discharged home | 67 | 11 | 7 |

**Figure S2** Individual weight line plots based on oedematous status from baseline.

** a**) Non-oedematous at baseline **b)**  Oedema present at baseline

**a)** Represents individual weight between treatments across time (days) of children that presented with no oedema upon admission.

**b)** Represents individual weight between treatments across time (days) of children that presented with oedema upon admission.

Black lines represents the mean