**Model nutrition assessment report**

(based on the Save the Children Fund emergency nutrition assessment handbook)

# **Report of Nutrition and Mortality in (region, camp etc) of (country) during (date to date).**

**(Date of report)**

(**Name of responsible authors)**

***Executive summary (one to two pages only)***

· geographic area surveyed and population type

· dates of survey

· methodology used (sampling, sample size, main indicators)

· main anthropometric results (prevalence of global and severe acute malnutrition in terms of z-scores and/or oedema and 95% confidence intervals)  
GAM: 13.1 % (12.2 - 14.0 95% C.I.)  
SAM : 2.0 % (1.7 - 2.4 95% C.I.)

· mortality rates (CMR and U5MR and 95% confidence intervals)  
CMR: (95% CI)  
U5MR: (95% CI)

· other important results (vaccination rates etc)

· brief interpretation of the results

· recommendations.

**1. Introduction**

description of survey area

· name of country, province, district, sub-district, etc

· if applicable, name of camp(s) or settlement(s)

· type of setting (e.g., rural, urban, camp, etc)

· if available/applicable, the surface area

· if applicable, brief description of terrain (e.g., mountains, desert, etc.)

· if applicable, brief description of the climate and the season when the survey was conducted

of the population

· total number of people living in survey area

· if applicable, type of population (resident, IDPs, refugees, mixed, etc)

· if applicable, ethnic and/or religious groups

· major livelihoods in the area (e.g., agriculture, pastoralist, traders, etc)

and humanitarian assistance

· relief programmes in area

· number of people on food aid, etc

· availability of health services,

· quality of roads, access to markets, etc

**1.1 Survey Objectives**

example,

· estimate the prevalence of acute malnutrition

· estimate retrospective mortality rates

· understand the causes of malnutrition

· (estimate the coverage of a feeding programme)

· make recommendations for a programme.

**2. Methodology**

**2.1 Sample size**

· What sampling methodology (e.g., systematic random sampling, cluster sampling, etc.) did you chose? Why?

· How did you calculate the sample size for anthropometry? (show the sample size calculation, including assumptions for expected prevalence, expected DEFF [if cluster sampling], required precision); if number of children was converted into the number of households, describe how this was done

· How did you calculate the sample size for mortality? (show the sample size calculation, including assumptions for expected CMR, expected DEFF [if cluster sampling], required precision)

· Describe whether sample sizes were adjusted for non-response, and if yes, justify the predicted non-response rate

· If both mortality and anthropometry was measured, how did you reconcile sample sizes?

· If cluster sampling, how did you decide how many clusters and how many households per cluster?

**2.2 Sampling procedure: selecting clusters**

· What population figures did you get and from whom (for example, village level population figures from district council)? How old was population data?

· How did you assign the clusters? (for example, 30 clusters were randomly selected by assigning probability proportional to population size)

· Describe any changes to the selection of the clusters during the survey. How many clusters were not visited and why? Were they replaced, and if yes how replacement clusters were identified?

**2.3 Sampling procedure: selecting households and children**

· How did you choose the households and children within a cluster?

· If random selection through enumeration or through segmentation with subsequent enumeration was used, describe briefly how this was carried out

· If systematic random sampling was used, describe how the total number of houses in the cluster, the sampling interval and the random start were determined

· If modified EPI method was used, describe key procedures (how initial direction was determined, how the 1st household was selected, how subsequent households were selected, etc)

· If other method was used, explain why and briefly describe the method

· If several different selection methods were used depending on the cluster, explain which methods were used, and how many clusters used each method?

· Were empty households or households with absent children re-visited? If yes, how?

· Were empty or non-responding households replaced? If yes, how?

· Were all eligible children in selected households weighted and measured?

· Who were survey respondents, and how were they selected within the household?

**2.4 Case definitions and inclusion criteria**

· What was your definition of the household?

· What was the age range of the children included in anthropometry survey?

· If age was unknown, how did you decide whether or not to include children?

· What was your cut-off for deciding whether the height of the child should be measured standing up or laying down?

· What was your case definition for GAM and SAM? Did you ascertain bilateral oedema? If yes, how?

· What growth standard (NCHS or WHO) did you use to report you principal anthropometry results?

· What was the length or recall period in mortality survey?

· What well-known event did you use to explain to survey responders the date of the start of recall period?

· If other indicators (e.g., anaemia, retrospective morbidity, immunization coverage) were measured, provide case definitions, the way they were measured (e.g., using HemoCue, or using child’s immunization card), and state who the respondents for these questions were

· If mortality survey was conducted, were households with no eligible children for anthropometry included in mortality survey?

**2.5 Questionnaire, training and supervision**

· in what language was questionnaire used in the field?

· in what language(s) interviews in the field were conducted?

· if applicable, was the questionnaire translated and back-translated by a different translator before the survey?

· was the questionnaire pre-tested (piloted) before the survey?

· are the copies of the questionnaire in English and in local language included in the Appendices?

teams and supervision

· What was the composition of the survey team?

· How many teams were trained, and how many participated in the survey?

· What were the qualifications (education, experience ) of the survey workers?

· How many team supervisors participated in the survey?

· What were the qualifications (education, experience ) of the team supervisors?

· Were survey teams supervised at all times, or were supervisors shared by several teams?

· Who conducted the training for survey teams?

· What did the training cover (e.g., general survey objectives, overview of survey design, household selection procedures, anthropometric measurements, signs and symptoms of malnutrition, data collection and interview skills, mortality interview, )?

· Was the anthropometry standardization exercise conducted as part of the training? If yes, how many children were measured by the teams?

· What was the duration of the training?

· Was the pre-test conducted? If yes, how many children/households included in the pre-test?

· Is the training schedule included as an appendix?

**2.6 Data analysis**

· Who and where entered data?

· What quality control procedures (e.g., double data entry, random checks on a certain percentage of entered records, etc.) were used?

· What type of computer programmes did you use?

· Were outliers in anthropometry data excluded from the analysis? If yes, how the boundaries for exclusion were defined (e.g., +/- 3 SD of WHZ from the observed WHZ mean)?

***3. Results***

"Table 3.0 Survey sample and nonresponse"

(copy-paste from Excel table of refused and absent households and children)

**3.1 Anthropometric results (based on WHO standards 2006):**

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3

Table 3.1: Distribution of age and sex of sample

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Boys** |  | **Girls** |  | **Total** |  | **Ratio** |
| **AGE (mo)** | **no.** | **%** | **no.** | **%** | **no.** | **%** | **Boy:girl** |
| **6-17** | 833 | 50.2 | 828 | 49.8 | 1661 | 23.0 | 1.0 |
| **18-29** | 912 | 49.1 | 946 | 50.9 | 1858 | 25.7 | 1.0 |
| **30-41** | 908 | 49.4 | 931 | 50.6 | 1839 | 25.5 | 1.0 |
| **42-53** | 775 | 52.2 | 711 | 47.8 | 1486 | 20.6 | 1.1 |
| **54-59** | 186 | 49.6 | 189 | 50.4 | 375 | 5.2 | 1.0 |
| **Total** | 3614 | 50.1 | 3605 | 49.9 | 7219 | 100.0 | 1.0 |

Figure 3.1: Population age and sex pyramid

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7869 | **Boys**  n **=** 3924 | **Girls**  n **=** 3945 |
| **Prevalence of global malnutrition**  **(<-2 z-score and/or oedema)** | (1027) 13.1 %  (12.2 - 14.0 95% C.I.) | (577) 14.7 %  (13.5 - 16.0 95% C.I.) | (450) 11.4 %  (10.4 - 12.6 95% C.I.) |
| **Prevalence of moderate malnutrition**  **(<-2 z-score and >=-3 z-score, no oedema)** | (870) 11.1 %  (10.3 - 11.9 95% C.I.) | (481) 12.3 %  (11.2 - 13.4 95% C.I.) | (389) 9.9 %  (8.9 - 10.9 95% C.I.) |
| **Prevalence of severe malnutrition**  **(<-3 z-score and/or oedema)** | (157) 2.0 %  (1.7 - 2.4 95% C.I.) | (96) 2.4 %  (2.0 - 3.0 95% C.I.) | (61) 1.5 %  (1.2 - 2.0 95% C.I.) |

The prevalence of oedema is 0.1 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe wasting**  **(<-3 z-score)** | | **Moderate wasting**  **(>= -3 and <-2 z-score )** | | **Normal**  **(> = -2 z score)** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1626 | 47 | 2.9 | 242 | 14.9 | 1336 | 82.2 | 1 | 0.1 |
| **18-29** | 1822 | 47 | 2.6 | 219 | 12.0 | 1553 | 85.2 | 3 | 0.2 |
| **30-41** | 1826 | 16 | 0.9 | 155 | 8.5 | 1654 | 90.6 | 1 | 0.1 |
| **42-53** | 1481 | 25 | 1.7 | 158 | 10.7 | 1298 | 87.6 | 0 | 0.0 |
| **54-59** | 374 | 5 | 1.3 | 39 | 10.4 | 330 | 88.2 | 0 | 0.0 |
| **Total** | 7129 | 140 | 2.0 | 813 | 11.4 | 6171 | 86.6 | 5 | 0.1 |

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

|  |  |  |
| --- | --- | --- |
|  | **<-3 z-score** | **>=-3 z-score** |
| **Oedema present** | Marasmic kwashiorkor. 2  (0.0 %) | Kwashiorkor. 3  (0.0 %) |
| **Oedema absent** | Marasmic  No. 214  (2.7 %) | Not severely malnourished. 7788  (97.3 %) |

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7220 | **Boys**  n **=** 3615 | **Girls**  n **=** 3605 |
| **Prevalence of global malnutrition**  **(< 125 mm and/or oedema)** | (397) 5.5 %  (4.8 - 6.3 95% C.I.) | (167) 4.6 %  (3.9 - 5.5 95% C.I.) | (230) 6.4 %  (5.5 - 7.4 95% C.I.) |
| **Prevalence of moderate malnutrition**  **(< 125 mm and >= 115 mm, no oedema)** | (285) 3.9 %  (3.4 - 4.6 95% C.I.) | (117) 3.2 %  (2.7 - 3.9 95% C.I.) | (168) 4.7 %  (3.9 - 5.5 95% C.I.) |
| **Prevalence of severe malnutrition**  **(< 115 mm and/or oedema)** | (112) 1.6 %  (1.2 - 1.9 95% C.I.) | (50) 1.4 %  (1.0 - 1.9 95% C.I.) | (62) 1.7 %  (1.3 - 2.2 95% C.I.) |

Table 3.6: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe wasting**  **(< 115 mm)** | | **Moderate wasting**  **(>= 115 mm and < 125 mm)** | | **Normal**  **(> = 125 mm )** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1661 | 59 | 3.6 | 150 | 9.0 | 1452 | 87.4 | 1 | 0.1 |
| **18-29** | 1858 | 45 | 2.4 | 90 | 4.8 | 1723 | 92.7 | 3 | 0.2 |
| **30-41** | 1839 | 4 | 0.2 | 33 | 1.8 | 1802 | 98.0 | 1 | 0.1 |
| **42-53** | 1486 | 1 | 0.1 | 9 | 0.6 | 1476 | 99.3 | 0 | 0.0 |
| **54-59** | 375 | 0 | 0.0 | 3 | 0.8 | 372 | 99.2 | 0 | 0.0 |
| **Total** | 7219 | 109 | 1.5 | 285 | 3.9 | 6825 | 94.5 | 5 | 0.1 |

Table 3.7: Prevalence of combined GAM and SAM based on WHZ and MUAC cut off's (and/or oedema) and by sex\*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7959 | **Boys**  n **=** 3979 | **Girls**  n **=** 3980 |
| **Prevalence of combined GAM**  **(WHZ <-2 and/or MUAC < 125 mm and/or oedema)** | (1173) 14.7 %  (15.2 - 17.4 95% C.I.) | (627) 15.8 %  (16.0 - 18.8 95% C.I.) | (546) 13.7 %  (13.8 - 16.5 95% C.I.) |
| **Prevalence of combined SAM**  **(WHZ < -3 and/or MUAC < 115 mm and/or oedema** | (233) 2.9 %  (2.8 - 3.7 95% C.I.) | (127) 3.2 %  (2.9 - 4.2 95% C.I.) | (106) 2.7 %  (2.4 - 3.6 95% C.I.) |

\*With SMART or WHO flags a missing MUAC/WHZ or not plausible WHZ value is considered as normal when the other value is available

3.8: Detailed numbers for combined GAM and SAM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **GAM** |  | **SAM** |  |
|  | **no.** | **%** | **no.** | **%** |
| **MUAC** | 146 | 1.8 | 76 | 1.0 |
| **WHZ** | 776 | 9.7 | 121 | 1.5 |
| **Both** | 246 | 3.1 | 31 | 0.4 |
| **Edema** | 5 | 0.1 | 5 | 0.1 |
| **Total** | 1173 | 14.7 | 233 | 2.9 |

Total population: 7959

Table 3.9: Prevalence of underweight based on weight-for-age z-scores by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7870 | **Boys**  n **=** 3930 | **Girls**  n **=** 3940 |
| **Prevalence of underweight**  **(<-2 z-score)** | (2634) 33.5 %  (31.9 - 35.1 95% C.I.) | (1364) 34.7 %  (32.8 - 36.7 95% C.I.) | (1270) 32.2 %  (30.3 - 34.2 95% C.I.) |
| **Prevalence of moderate underweight**  **(<-2 z-score and >=-3 z-score)** | (1785) 22.7 %  (21.6 - 23.8 95% C.I.) | (911) 23.2 %  (21.8 - 24.6 95% C.I.) | (874) 22.2 %  (20.8 - 23.7 95% C.I.) |
| **Prevalence of severe underweight**  **(<-3 z-score)** | (849) 10.8 %  (9.9 - 11.8 95% C.I.) | (453) 11.5 %  (10.4 - 12.8 95% C.I.) | (396) 10.1 %  (8.9 - 11.3 95% C.I.) |

Table 3.10: Prevalence of underweight by age, based on weight-for-age z-scores

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe underweight**  **(<-3 z-score)** | | **Moderate underweight**  **(>= -3 and <-2 z-score )** | | **Normal**  **(> = -2 z score)** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1627 | 193 | 11.9 | 365 | 22.4 | 1069 | 65.7 | 1 | 0.1 |
| **18-29** | 1817 | 255 | 14.0 | 460 | 25.3 | 1102 | 60.6 | 3 | 0.2 |
| **30-41** | 1824 | 188 | 10.3 | 425 | 23.3 | 1211 | 66.4 | 1 | 0.1 |
| **42-53** | 1479 | 132 | 8.9 | 360 | 24.3 | 987 | 66.7 | 0 | 0.0 |
| **54-59** | 374 | 38 | 10.2 | 86 | 23.0 | 250 | 66.8 | 0 | 0.0 |
| **Total** | 7121 | 806 | 11.3 | 1696 | 23.8 | 4619 | 64.9 | 5 | 0.1 |

Table 3.11: Prevalence of stunting based on height-for-age z-scores and by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7660 | **Boys**  n **=** 3811 | **Girls**  n **=** 3849 |
| **Prevalence of stunting**  **(<-2 z-score)** | (3181) 41.5 %  (39.8 - 43.3 95% C.I.) | (1676) 44.0 %  (41.9 - 46.1 95% C.I.) | (1505) 39.1 %  (37.0 - 41.2 95% C.I.) |
| **Prevalence of moderate stunting**  **(<-2 z-score and >=-3 z-score)** | (1912) 25.0 %  (23.9 - 26.1 95% C.I.) | (974) 25.6 %  (24.2 - 27.0 95% C.I.) | (938) 24.4 %  (22.8 - 26.0 95% C.I.) |
| **Prevalence of severe stunting**  **(<-3 z-score)** | (1269) 16.6 %  (15.4 - 17.8 95% C.I.) | (702) 18.4 %  (16.9 - 20.1 95% C.I.) | (567) 14.7 %  (13.4 - 16.1 95% C.I.) |

Table 3.12: Prevalence of stunting by age based on height-for-age z-scores

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe stunting**  **(<-3 z-score)** | | **Moderate stunting**  **(>= -3 and <-2 z-score )** | | **Normal**  **(> = -2 z score)** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1588 | 227 | 14.3 | 380 | 23.9 | 981 | 61.8 |
| **18-29** | 1764 | 393 | 22.3 | 475 | 26.9 | 896 | 50.8 |
| **30-41** | 1757 | 332 | 18.9 | 509 | 29.0 | 916 | 52.1 |
| **42-53** | 1446 | 215 | 14.9 | 366 | 25.3 | 865 | 59.8 |
| **54-59** | 366 | 50 | 13.7 | 89 | 24.3 | 227 | 62.0 |
| **Total** | 6921 | 1217 | 17.6 | 1819 | 26.3 | 3885 | 56.1 |

Table 3.13: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7869 | **Boys**  n **=** 3924 | **Girls**  n **=** 3945 |
| **Prevalence of overweight (WHZ > 2)** | (14) 0.2 %  (0.1 - 0.3 95% C.I.) | (5) 0.1 %  (0.1 - 0.3 95% C.I.) | (9) 0.2 %  (0.1 - 0.5 95% C.I.) |
| **Prevalence of severe overweight (WHZ > 3)** | (0) 0.0 %  (0.0 - 0.0 95% C.I.) | (0) 0.0 %  (0.0 - 0.0 95% C.I.) | (0) 0.0 %  (0.0 - 0.0 95% C.I.) |

Table 3.14: Prevalence of overweight by age, based on weight for height (no oedema)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Overweight**  **(WHZ > 2)** | | **Severe Overweight (WHZ > 3)** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1626 | 2 | 0.1 | 0 | 0.0 |
| **18-29** | 1822 | 2 | 0.1 | 0 | 0.0 |
| **30-41** | 1826 | 1 | 0.1 | 0 | 0.0 |
| **42-53** | 1481 | 0 | 0.0 | 0 | 0.0 |
| **54-59** | 374 | 0 | 0.0 | 0 | 0.0 |
| **Total** | 7129 | 5 | 0.1 | 0 | 0.0 |

Table 3.15: Mean z-scores, Design Effects and excluded subjects

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indicator | n | Mean z-scores ± SD | Design Effect (z-score < -2) | z-scores not available\* | z-scores out of range |
| Weight-for-Height | 7864 | -0.83±1.03 | 1.52 | 12 | 138 |
| Weight-for-Age | 7870 | -1.55±1.12 | 2.45 | 5 | 139 |
| Height-for-Age | 7660 | -1.73±1.25 | 2.60 | 0 | 354 |

\* contains for WHZ and WAZ the children with edema.

**3.2 Mortality results (retrospective over x months/days prior to interview)**

Table 3.16: Mortality rates

|  |
| --- |
| CMR (total deaths/10,000 people / day): (95% CI) |
| U5MR (deaths in children under five/10,000 children under five / day): (95% CI) |

the main causes of death as given by the MoH and the community leaders.

mean household size is calculated as … (mode =, range )

***3.3 Children’s morbidity***

you have collected data on children’s morbidity using a household questionnaire then you should present in the format shown below.

*Table 3.17: Prevalence of reported illness in children in the two weeks prior to interview (n=)*

|  |  |
| --- | --- |
|  | **6-59 months** |
| **Prevalence of reported illness** | % (95% C.I.) |

*Table 3.18: Symptom breakdown in the children in the two weeks prior to interview (n=)*

|  |  |
| --- | --- |
|  | **6-59 months** |
| **Diarrhoea** | % (95% C.I.) |
| **Cough** | % (95% C.I.) |
| **Fever** | % (95% C.I.) |
| **Measles** | % (95% C.I.) |
| **Other** | % (95% C.I.) |

***3.4 Vaccination Results***

*Table 3.18: Vaccination coverage: BCG for 6-59 months and measles for 9-59 months*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **BCG=** | **Measles**  **(with card)=** | **Measles**  **(with card or confirmation from mother)=** |
| **YES** | (No.) %  (95% C.I.) | (No.) %  (95% C.I.) | (No.) %  (95% C.I.) |

***3.5 Programme coverage***

|  |  |
| --- | --- |
| **Programme type** |  |
| **Supplementary feeding programme coverage** | %  (95% C.I.) |
| **Therapeutic feeding programme coverage** | %  (95% C.I.) |

*Data on the causes of malnutrition (other than those above)*

· Leave this for the discussion

***4. Discussion***

***4.1 Nutritional status***

· discuss sample sex ratio — any bias? If so, explain why you think there is bias

· prevalence of acute malnutrition

· if previous survey results are available, how do these results compare to before, or to other areas nearby?

· how does the prevalence compare to national benchmarks of malnutrition?

· Is the prevalence of malnutrition typical or not?

***4.2 Mortality***

· Do you suspect any bias in the findings?

· Mortality rates

· if previous survey results are available, how do these results compare to before, or to other areas nearby?

· How do the rates compare to benchmarks?

· Is the mortality rate typical or not?

***4.3 Causes of malnutrition***

· What are the major acute causes of malnutrition and where possible the causes of mortality (taking into account causes already addressed by other interventions)? Consider immediate, underlying and basic causes.

· What are the prospects for the coming months? Will the situation get better or worse (refer to seasonal changes etc)

· Who is worst affected?

· What are the chronic causes of malnutrition?

· What does the community recommend?

· Does the story fit together? If not what are the unanswered questions

· A diagram to show the causal framework of malnutrition may be useful.

***.4* Programme coverage**

· rate of coverage for any SFP/TFC programmes

· explanation for rates (good/bad/why)

· given the prevalence of malnutrition found, how many children should be enrolled?

***5. Conclusions***

Overall conclusions on the severity of the situation and the urgency of the response required

***6. Recommendations and priorities***

to prioritise recommendations and try to give a time when action would be appropriate (e.g, immediate, medium term or longer term).

nutrition monitoring

· Is it necessary to carry out another nutrition survey in this area in the near future? Who should do it? Should there be any changes to the survey methodology? When should the survey take place?

· Should there be food security indicator monitoring in this area? Who should do it?

***7. References***

all secondary sources to which you have referred in the text.

***8. Acknowledgements***

. List all government departments, International agencies, International NGOs, National NGOs and other organisations that supported or participated in the survey. (All involved in planning the survey and those organisations or individuals who have provided staff, vehicles, equipment, logistics).

. List donors and other sources of funds

. List the individuals involved in the survey

Supervisor/Manager:

Consultants/ Trainers/ Advisors/ analysists:

Logistics/administration: members:

Translators:

Drivers:

Others

. (Optional) List those who gave permission/ authorisation and otherwise supported the survey in a non-participatory way.

***9. Appendicies***

**Appendix 1**

***Plausibility Report***

**Appendix 2**

***Assignment of Clusters***

Geographical unit Population size Assigned cluster

**Appendix 3**

***Evaluation of Enumerators***

**Weight:**

Precision: Accuracy: No. +/- No. +/-

Sum of Square Sum of Square Precision Accuracy

[W1-W2] [Enum.(W1+W2)-

(Superv.(W1+W2)]

**Height:**

Precision: Accuracy: No. +/- No. +/-

Sum of Square Sum of Square Precision Accuracy

[H1-H2] [Enum.(H1+H2)-

Superv.(H1+H2)]

**MUAC:**

Precision: Accuracy: No. +/- No. +/-

Sum of Square Sum of Square Precision Accuracy

[MUAC1-MUAC2] [Enum.(MUAC1+MUAC2)-

Superv.(MUAC1+MUAC2]

For evaluating the enumerators the precision and the accuracy of their measurements is calculated.

For precision the sum of the square of the differences for the double measurements is calculated. This value should be less than two times the precision value of the supervisor.

For the accuracy the sum of the square of the differences between the enumerator values (weight1+weight2) and the supervisor values (weight1+weight2) is calculated. This value should be less than three times the precision value of the supervisor.

To check for systematic errors of the enumerators the number of positive and negative deviations can be used.

**Appendix 4**

***Result Tables for NCHS growth reference 1977***

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7905 | **Boys**  n **=** 3968 | **Girls**  n **=** 3937 |
| **Prevalence of global malnutrition**  **(<-2 z-score and/or oedema)** | (928) 11.7 %  (10.9 - 12.6 95% C.I.) | (512) 12.9 %  (11.8 - 14.1 95% C.I.) | (416) 10.6 %  (9.5 - 11.7 95% C.I.) |
| **Prevalence of moderate malnutrition**  **(<-2 z-score and >=-3 z-score, no oedema)** | (859) 10.9 %  (10.1 - 11.7 95% C.I.) | (471) 11.9 %  (10.8 - 13.0 95% C.I.) | (388) 9.9 %  (8.8 - 11.0 95% C.I.) |
| **Prevalence of severe malnutrition**  **(<-3 z-score and/or oedema)** | (69) 0.9 %  (0.7 - 1.1 95% C.I.) | (41) 1.0 %  (0.8 - 1.4 95% C.I.) | (28) 0.7 %  (0.5 - 1.0 95% C.I.) |

The prevalence of oedema is 0.1 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe wasting**  **(<-3 z-score)** | | **Moderate wasting**  **(>= -3 and <-2 z-score )** | | **Normal**  **(> = -2 z score)** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1647 | 23 | 1.4 | 195 | 11.8 | 1428 | 86.7 | 1 | 0.1 |
| **18-29** | 1845 | 29 | 1.6 | 307 | 16.6 | 1506 | 81.6 | 3 | 0.2 |
| **30-41** | 1835 | 6 | 0.3 | 152 | 8.3 | 1676 | 91.3 | 1 | 0.1 |
| **42-53** | 1483 | 2 | 0.1 | 158 | 10.7 | 1323 | 89.2 | 0 | 0.0 |
| **54-59** | 375 | 2 | 0.5 | 35 | 9.3 | 338 | 90.1 | 0 | 0.0 |
| **Total** | 7185 | 62 | 0.9 | 847 | 11.8 | 6271 | 87.3 | 5 | 0.1 |

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

|  |  |  |
| --- | --- | --- |
|  | **<-3 z-score** | **>=-3 z-score** |
| **Oedema present** | Marasmic kwashiorkor. 1  (0.0 %) | Kwashiorkor. 4  (0.1 %) |
| **Oedema absent** | Marasmic  No. 70  (0.9 %) | Not severely malnourished. 7898  (99.1 %) |

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7220 | **Boys**  n **=** 3615 | **Girls**  n **=** 3605 |
| **Prevalence of global malnutrition**  **(< 125 mm and/or oedema)** | (397) 5.5 %  (4.8 - 6.3 95% C.I.) | (167) 4.6 %  (3.9 - 5.5 95% C.I.) | (230) 6.4 %  (5.5 - 7.4 95% C.I.) |
| **Prevalence of moderate malnutrition**  **(< 125 mm and >= 115 mm, no oedema)** | (285) 3.9 %  (3.4 - 4.6 95% C.I.) | (117) 3.2 %  (2.7 - 3.9 95% C.I.) | (168) 4.7 %  (3.9 - 5.5 95% C.I.) |
| **Prevalence of severe malnutrition**  **(< 115 mm and/or oedema)** | (112) 1.6 %  (1.2 - 1.9 95% C.I.) | (50) 1.4 %  (1.0 - 1.9 95% C.I.) | (62) 1.7 %  (1.3 - 2.2 95% C.I.) |

Table 3.6: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe wasting**  **(< 115 mm)** | | **Moderate wasting**  **(>= 115 mm and < 125 mm)** | | **Normal**  **(> = 125 mm )** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1661 | 59 | 3.6 | 150 | 9.0 | 1452 | 87.4 | 1 | 0.1 |
| **18-29** | 1858 | 45 | 2.4 | 90 | 4.8 | 1723 | 92.7 | 3 | 0.2 |
| **30-41** | 1839 | 4 | 0.2 | 33 | 1.8 | 1802 | 98.0 | 1 | 0.1 |
| **42-53** | 1486 | 1 | 0.1 | 9 | 0.6 | 1476 | 99.3 | 0 | 0.0 |
| **54-59** | 375 | 0 | 0.0 | 3 | 0.8 | 372 | 99.2 | 0 | 0.0 |
| **Total** | 7219 | 109 | 1.5 | 285 | 3.9 | 6825 | 94.5 | 5 | 0.1 |

Table 3.7: Prevalence of combined GAM and SAM based on WHZ and MUAC cut off's (and/or oedema) and by sex\*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7939 | **Boys**  n **=** 3982 | **Girls**  n **=** 3957 |
| **Prevalence of combined GAM**  **(WHZ <-2 and/or MUAC < 125 mm and/or oedema)** | (1105) 13.9 %  (14.3 - 16.4 95% C.I.) | (570) 14.3 %  (14.5 - 17.1 95% C.I.) | (535) 13.5 %  (13.6 - 16.2 95% C.I.) |
| **Prevalence of combined SAM**  **(WHZ < -3 and/or MUAC < 115 mm and/or oedema** | (154) 1.9 %  (1.8 - 2.5 95% C.I.) | (78) 2.0 %  (1.7 - 2.7 95% C.I.) | (76) 1.9 %  (1.7 - 2.6 95% C.I.) |

\*With SMART or WHO flags a missing MUAC/WHZ or not plausible WHZ value is considered as normal when the other value is available

3.8: Detailed numbers for combined GAM and SAM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **GAM** |  | **SAM** |  |
|  | **no.** | **%** | **no.** | **%** |
| **MUAC** | 177 | 2.2 | 85 | 1.1 |
| **WHZ** | 708 | 8.9 | 42 | 0.5 |
| **Both** | 215 | 2.7 | 22 | 0.3 |
| **Edema** | 5 | 0.1 | 5 | 0.1 |
| **Total** | 1105 | 13.9 | 154 | 1.9 |

Total population: 7939

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

|  |  |
| --- | --- |
|  | n = 7905 |
| **Prevalence of global acute malnutrition**  **(<80% and/or oedema)** | (588) 7.4 %  (6.7 - 8.2 95% C.I.) |
| **Prevalence of moderate acute malnutrition**  **(<80% and >= 70%, no oedema)** | (556) 7.0 %  (6.4 - 7.8 95% C.I.) |
| **Prevalence of severe acute malnutrition**  **(<70% and/or oedema)** | (32) 0.4 %  (0.3 - 0.6 95% C.I.) |

Table 3.9: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe wasting**  **(<70% median)** | | **Moderate wasting**  **(>=70% and <80% median)** | | **Normal**  **(> =80% median)** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1647 | 11 | 0.7 | 132 | 8.0 | 1503 | 91.3 | 1 | 0.1 |
| **18-29** | 1845 | 13 | 0.7 | 207 | 11.2 | 1622 | 87.9 | 3 | 0.2 |
| **30-41** | 1835 | 1 | 0.1 | 96 | 5.2 | 1737 | 94.7 | 1 | 0.1 |
| **42-53** | 1483 | 0 | 0.0 | 87 | 5.9 | 1396 | 94.1 | 0 | 0.0 |
| **54-59** | 375 | 0 | 0.0 | 19 | 5.1 | 356 | 94.9 | 0 | 0.0 |
| **Total** | 7185 | 25 | 0.3 | 541 | 7.5 | 6614 | 92.1 | 5 | 0.1 |

Table 3.9: Prevalence of underweight based on weight-for-age z-scores by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7890 | **Boys**  n **=** 3947 | **Girls**  n **=** 3943 |
| **Prevalence of underweight**  **(<-2 z-score)** | (3141) 39.8 %  (38.2 - 41.5 95% C.I.) | (1574) 39.9 %  (37.9 - 41.8 95% C.I.) | (1567) 39.7 %  (37.8 - 41.8 95% C.I.) |
| **Prevalence of moderate underweight**  **(<-2 z-score and >=-3 z-score)** | (2263) 28.7 %  (27.5 - 29.9 95% C.I.) | (1125) 28.5 %  (27.0 - 30.0 95% C.I.) | (1138) 28.9 %  (27.4 - 30.4 95% C.I.) |
| **Prevalence of severe underweight**  **(<-3 z-score)** | (878) 11.1 %  (10.2 - 12.1 95% C.I.) | (449) 11.4 %  (10.3 - 12.6 95% C.I.) | (429) 10.9 %  (9.7 - 12.1 95% C.I.) |

Table 3.10: Prevalence of underweight by age, based on weight-for-age z-scores

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe underweight**  **(<-3 z-score)** | | **Moderate underweight**  **(>= -3 and <-2 z-score )** | | **Normal**  **(> = -2 z score)** | | **Oedema** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1646 | 226 | 13.7 | 513 | 31.2 | 907 | 55.1 | 1 | 0.1 |
| **18-29** | 1825 | 307 | 16.8 | 626 | 34.3 | 892 | 48.9 | 3 | 0.2 |
| **30-41** | 1826 | 183 | 10.0 | 535 | 29.3 | 1108 | 60.7 | 1 | 0.1 |
| **42-53** | 1482 | 116 | 7.8 | 446 | 30.1 | 920 | 62.1 | 0 | 0.0 |
| **54-59** | 375 | 34 | 9.1 | 109 | 29.1 | 232 | 61.9 | 0 | 0.0 |
| **Total** | 7154 | 866 | 12.1 | 2229 | 31.2 | 4059 | 56.7 | 5 | 0.1 |

Table 3.11: Prevalence of stunting based on height-for-age z-scores and by sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7734 | **Boys**  n **=** 3872 | **Girls**  n **=** 3862 |
| **Prevalence of stunting**  **(<-2 z-score)** | (2680) 34.7 %  (33.0 - 36.4 95% C.I.) | (1376) 35.5 %  (33.5 - 37.6 95% C.I.) | (1304) 33.8 %  (31.8 - 35.8 95% C.I.) |
| **Prevalence of moderate stunting**  **(<-2 z-score and >=-3 z-score)** | (1754) 22.7 %  (21.5 - 23.9 95% C.I.) | (894) 23.1 %  (21.7 - 24.6 95% C.I.) | (860) 22.3 %  (20.8 - 23.8 95% C.I.) |
| **Prevalence of severe stunting**  **(<-3 z-score)** | (926) 12.0 %  (11.0 - 13.1 95% C.I.) | (482) 12.4 %  (11.2 - 13.8 95% C.I.) | (444) 11.5 %  (10.3 - 12.8 95% C.I.) |

Table 3.12: Prevalence of stunting by age based on height-for-age z-scores

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Severe stunting**  **(<-3 z-score)** | | **Moderate stunting**  **(>= -3 and <-2 z-score )** | | **Normal**  **(> = -2 z score)** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1616 | 168 | 10.4 | 383 | 23.7 | 1065 | 65.9 |
| **18-29** | 1785 | 280 | 15.7 | 438 | 24.5 | 1067 | 59.8 |
| **30-41** | 1764 | 230 | 13.0 | 454 | 25.7 | 1080 | 61.2 |
| **42-53** | 1441 | 176 | 12.2 | 333 | 23.1 | 932 | 64.7 |
| **54-59** | 363 | 47 | 12.9 | 85 | 23.4 | 231 | 63.6 |
| **Total** | 6969 | 901 | 12.9 | 1693 | 24.3 | 4375 | 62.8 |

Table 3.13: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All**  n = 7905 | **Boys**  n **=** 3968 | **Girls**  n **=** 3937 |
| **Prevalence of overweight (WHZ > 2)** | (6) 0.1 %  (0.0 - 0.2 95% C.I.) | (2) 0.1 %  (0.0 - 0.2 95% C.I.) | (4) 0.1 %  (0.0 - 0.3 95% C.I.) |
| **Prevalence of severe overweight (WHZ > 3)** | (0) 0.0 %  (0.0 - 0.0 95% C.I.) | (0) 0.0 %  (0.0 - 0.0 95% C.I.) | (0) 0.0 %  (0.0 - 0.0 95% C.I.) |

Table 3.14: Prevalence of overweight by age, based on weight for height (no oedema)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Overweight**  **(WHZ > 2)** | | **Severe Overweight (WHZ > 3)** | |
| **Age (mo)** | **Total no.** | **No.** | **%** | **No.** | **%** |
| **6-17** | 1647 | 2 | 0.1 | 0 | 0.0 |
| **18-29** | 1845 | 0 | 0.0 | 0 | 0.0 |
| **30-41** | 1835 | 0 | 0.0 | 0 | 0.0 |
| **42-53** | 1483 | 1 | 0.1 | 0 | 0.0 |
| **54-59** | 375 | 0 | 0.0 | 0 | 0.0 |
| **Total** | 7185 | 3 | 0.0 | 0 | 0.0 |

Table 3.15: Mean z-scores, Design Effects and excluded subjects

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Indicator | n | Mean z-scores ± SD | Design Effect (z-score < -2) | z-scores not available\* | z-scores out of range |
| Weight-for-Height | 7900 | -0.95±0.92 | 1.52 | 46 | 68 |
| Weight-for-Age | 7890 | -1.69±1.08 | 2.39 | 5 | 119 |
| Height-for-Age | 7734 | -1.52±1.21 | 2.64 | 0 | 280 |

\* contains for WHZ and WAZ the children with edema.

**Appendix 5**

Maps of area

**Appendix 6**