

Rapid nutrition assessment and mortality in Zamzam camp, North Darfur, Sudan
January 2024

Context

Zamzam IDP camp, one of the biggest and oldest IPD camps in Sudan, is located nearby El Fasher town in North Darfur. MSF carried out a rapid nutritional assessment to obtain an estimate of the prevalence of acute malnutrition in children, as well as in pregnant and breast-feeding women in addition to describing retrospective crude and under five mortality rates and causes of death among households within the camp.

Methodology

An assessment with random geospatial cluster sampling was carried out in Zamzam camp from January 10-13th 2024. Twenty random points were selected, with teams visiting 20 households surrounding each point. The assessment included the nutritional status of children aged 6 to 59 months and pregnant or breastfeeding women based on mid-upper arm circumference (MUAC) and the presence or absence of nutritional oedema and nutritional program coverage. To assess mortality, the head of the household was asked if any member of their household died during the recall period (1 October 2023 to date of assessment). Demographic variables of deceased individuals were collected as well as reported cause, date, and place of death. Information was additionally collected on the total number of household members (by sex) and the total number of members under 5 years old. The interviewers were trained over 2 days and a standardization test was carried out at the end of the training to check the interviewers' ability to take MUAC measurements. Analysis was done using ENA for SMART software.

Results

A total of 400 households were included from January 10-13, 2024. Among 3296 current household members, averaging 8.2 members per household, 22% were children under 5 years old and 45% men.

Nutrition

Children 6-59 months

The MAM and SAM prevalences among children 6-59 months were 15.9% [95% CI 12.4 – 20.2] and 7.1% [95% CI 4.7 – 10.6], equalling a global acute malnutrition (GAM) prevalence of 23.1% [95% CI 18.4 – 28.5]. Two children (0.3%) were identified with bilateral oedema. Among children identified as SAM, the nutrition program coverage was 28% (n=13/47) and 29% (n=30/105) among the MAM. The design effect for MUAC <125 mm was 2.2, indicating a certain heterogeneity among and within the clusters selected.

Table 1. Prevalence of acute malnutrition by sex based on MUAC and bilateral oedema among children 6-59 months, Zamzam camp, Sudan

| | GAM (MUAC<125mm and/or oedema) | | | MAM (MUAC ≥ 115 et <125mm) | | | SAM (MUAC<115mm and/or oedema) | | |
|-------|--------------------------------|------|-------------|----------------------------|------|-------------|--------------------------------|-----|------------|
| | N | % | 95% CI | N | % | 95% CI | N | % | 95% CI |
| Total | 152/659 | 23.1 | 18.4 – 28.5 | 105/659 | 15.9 | 12.4 – 20.2 | 47/659 | 7.1 | 4.7 – 10.6 |
| Boys | 61/352 | 20.2 | 15.2 – 26.3 | 47/352 | 13.4 | 10.0 – 17.6 | 24/352 | 6.8 | 3.8 – 11.8 |
| Girls | 81/307 | 26.4 | 19.8 – 34.2 | 58/307 | 18.9 | 13.3 – 26.1 | 23/307 | 7.5 | 4.7 – 11.7 |

Children aged 6-23 months were particularly affected with a GAM prevalence of 38.8% [95% CI 30.9 – 47.4] and a SAM prevalence of 16.4% [95% CI 10.2 – 25.4].

Table 2. Prevalence of acute malnutrition by age based on MUAC and bilateral oedema among children 6-59 months, Zamzam camp, Sudan

| | GAM (MUAC <125 mm and/or oedema) | | | SAM (MUAC<115mm and/or oedema) | | |
|----------------|----------------------------------|------|-------------|--------------------------------|------|-------------|
| | N | % | 95% CI | N | % | 95% CI |
| 6 – 23 months | 85/219 | 38.8 | 30.9 – 47.4 | 36/219 | 16.4 | 10.2 – 25.4 |
| 24 – 59 months | 67/440 | 15.2 | 10.7 – 21.2 | 11/440 | 2.5 | 1.4 – 4.4 |

Pregnant and Lactating Women

Among 314 pregnant and lactating women screened during the assessment, the GAM prevalence was 40.8% [95% CI 32.5 – 49.5] with respectively 27.1% classified as MAM and 13.7% as SAM. One woman (0.3%) was identified with bilateral oedema.

Table 3. Acute malnutrition prevalence (MUAC and/or bilateral oedema) among pregnant and/or breastfeeding women, Zamzam camp, Sudan

| Pregnant and lactating women | N | % | 95% CI |
|---------------------------------|---------|------|-------------|
| GAM (MUAC<230mm and/or oedema) | 128/314 | 40.8 | 32.5 – 49.5 |
| MAM (MUAC≥210 and <230mm) | 85/314 | 27.1 | 21.3 – 33.7 |
| SAM (MUAC<210 mm and/or oedema) | 43/314 | 13.7 | 9.7 – 18.9 |

Mortality

The mortality rate was 2.5/10,000 people/day [95% CI 1.9 – 3.1] and under 5 mortality rate was 2.3 [95% CI 1.3 – 3.9]. The overall leading causes of death reported were malaria (25.9%) and trauma/accident (22.4%) and among children under 5 years old, the leading cause of death was respiratory infections (29.4%). Forty-four percent of the deaths occurred in the camp, 32% in a hospital/health centre, 6% in a transit camp, 4% in the village, 4% in the displacement and 11% other locations.

Table 4. Crude and specific mortality rates during the recall period, Zamzam camp, Sudan

| | N | Rate/10,000 people/ day | 95% CI | DEFF |
|------------------------|----|-------------------------|-----------|------|
| Crude mortality rate | 85 | 2.5 | 1.9 – 3.1 | 1.2 |
| Under-5 mortality rate | 17 | 2.3 | 1.3 – 3.9 | 1.2 |

Table 5. Causes of mortality by age and sex* during the recall period, Zamzam camp, Sudan

| Causes of death | Male | | Female | | < 5 years | | 5 years + | | Total | |
|-----------------|------|------|--------|------|-----------|------|-----------|------|-------|------|
| | n | % | n | % | n | % | n | % | n | % |
| Dengue Fever | 2 | 4.2 | 5 | 13.9 | 1 | 5.9 | 6 | 8.8 | 7 | 8.2 |
| Diarrhoea | 4 | 8.3 | 1 | 2.8 | 2 | 11.8 | 3 | 4.4 | 5 | 5.9 |
| Malaria | 13 | 27.1 | 8 | 22.2 | 2 | 11.8 | 20 | 29.4 | 22 | 25.9 |
| Malnutrition | 3 | 6.3 | 1 | 2.8 | 2 | 11.8 | 2 | 2.9 | 4 | 4.7 |
| Measles | 2 | 4.2 | 1 | 2.8 | 0 | 0.0 | 3 | 4.4 | 3 | 3.5 |

| | | | | | | | | | | |
|-----------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| Resp. Infection | 4 | 8.3 | 5 | 13.9 | 5 | 29.4 | 4 | 5.9 | 9 | 10.6 |
| Trauma/Accident | 12 | 25.0 | 7 | 19.4 | 2 | 11.8 | 17 | 25.0 | 19 | 22.4 |
| Violence | 2 | 4.2 | 0 | 0.0 | 0 | 0.0 | 2 | 2.9 | 2 | 2.4 |
| Other | 6 | 12.5 | 8 | 22.2 | 3 | 17.6 | 11 | 16.2 | 14 | 16.5 |
| Total | 48 | 100 | 36 | 100 | 17 | 100 | 68 | 100 | 85 | 100 |

*1 death missing information on sex

Discussion

We observed critical rates of malnutrition and high mortality among households in Zamzam camp. The GAM estimate among children was above 20% and among pregnant and lactating women above 40%. The main causes of death identified were malaria, trauma/accidents, and respiratory infections. Malaria deaths are consistent with the seasonal peak, although given the high number among household members 5 years and older, may have been confused with dengue fever. Accidents appear to be largely traffic accidents, one of the main killers observed according to the medical team. The high mortality, particularly as it appears to be unusually driven largely by deaths among the population 5 years and older, should be more fully explored including to understand if there was any misclassification of deaths (e.g. violence vs accidents, dengue vs malaria) to ensure appropriate response. As noted, not all reported deaths occurred in the camp and some may have occurred when a household member at least temporarily left the household, including those deaths linked to violence/accidents. While there are wide-ranging population estimates for Zamzam (from ~300,000-500,000 IDPs), the under-5 mortality rate observed equates to approximately 15 to 25 deaths among children under 5 each day.

To adapt to the context and constraints, certain aspects were simplified. The number of current household members was recorded, but arrivals and departures within the household were not. Thus, the denominator (person time) used in the assessment may differ from the true population at risk of death during the recall period; however, the short recall period minimized the expected number of movements within the household. Similarly, the number of random points used (20) was limited, with could have resulted in a larger sampling variance and lowers precision around the estimate. The causes of death must also be interpreted with caution, as they were reported by family members based on symptoms and observations, without autopsy or clinical diagnosis to verify the cause of death. Additionally, one team found a significantly higher number of malnourished children, including SAM, compared to other teams. While this may be explained by heterogeneity in malnutrition prevalence across the camp, it may also in part be explained by the quality of nutrition screening, particularly in an area which was challenging to provide continuous supervision. Nevertheless, excluding this team, the GAM and SAM prevalence estimates remain critical at 21.8% and 5.6%.

Conclusions

Elevated mortality rates and malnutrition prevalence were observed in Zamzam camp. According to the Integrated Food Security Classification (IPC), a GAM based on PB \geq 15% prevalence and a crude mortality rate above 2 demonstrates that the current situation should be considered as critical to extremely critical at level 4, requiring a significant intensification of the response.

Annex: Malnutrition results among children 6-59 months by team

| Team | GAM (MUAC<125mm and/or oedema) | | SAM (MUAC<115mm and/or oedema) | |
|--------------|--------------------------------|-------------|--------------------------------|------------|
| | n/N | % | n/N | % |
| 1 | 20/93 | 21.5 | 8/93 | 8.6 |
| 2 | 30/111 | 27.0 | 7/111 | 6.3 |
| 3 | 7/57 | 12.3 | 2/57 | 3.5 |
| 4 | 21/57 | 36.8 | 13/57 | 22.8 |
| 5 | 21/72 | 29.2 | 6/72 | 8.3 |
| 6 | 16/82 | 19.5 | 2/82 | 2.4 |
| 7 | 11/49 | 22.4 | 4/49 | 8.2 |
| 8 | 7/72 | 9.7 | 3/72 | 4.2 |
| 9 | 19/66 | 28.8 | 2/66 | 3.0 |
| Total | 152/659 | 23.1 | 47/659 | 7.1 |