Semi Quantitative Evaluation of Access and Coverage (SQUEAC) Assessment

Seleia and Kulbus Administrative Unit
West Darfur State
Republic of Sudan

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### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>CVs</td>
<td>Community Volunteers</td>
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<tr>
<td>CI</td>
<td>Confidence Interval</td>
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<tr>
<td>CMAM</td>
<td>Community Management of Acute Malnutrition</td>
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<td>CMN</td>
<td>Coverage Monitoring Network</td>
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<tr>
<td>CSAS</td>
<td>Centric Systematic Area Sampling</td>
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<tr>
<td>FGD</td>
<td>Focus Group Discussion</td>
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<td>HAC</td>
<td>Humanitarian Aid Commission</td>
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<td>IC</td>
<td>Inpatient Care</td>
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<tr>
<td>KII</td>
<td>Key Informant Interviews</td>
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<tr>
<td>LoS</td>
<td>Length of Stay</td>
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<td>MOH</td>
<td>Ministry Of Health</td>
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<td>MUAC</td>
<td>Mid Upper Arm Circumference</td>
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<td>OTP</td>
<td>Outpatient Therapeutic Programme</td>
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<tr>
<td>RUTF</td>
<td>Ready to Use Therapeutic Food</td>
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<td>SAM</td>
<td>Severe Acute Malnutrition</td>
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<tr>
<td>SSI</td>
<td>Semi Structure Interview</td>
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<tr>
<td>SQUEAC</td>
<td>Semi Quantitative Evaluation of Access and Coverage</td>
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<tr>
<td>TBA</td>
<td>Traditional Birth Attendants</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Acknowledgements

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EXECUTIVE SUMMARY

Concern Worldwide in collaboration with SMoH conducted a Semi-Quantitative Evaluation of Access & Coverage (SQUEAC) in January 2013 in Seleia & Kulbus locations West Darfur state. The SQUEAC evaluation was designed to provide an estimate the programme coverage as well as key barriers/boosters to access affecting the programme. The evaluation used a simplified version of the standard, 3-stage, Bayesian analysis. OTP coverage in Seleia & Kulbus was estimated to be:

Point Coverage 47.3% (95% C.I. 36.4% - 58.3%)

Period Coverage 59.3% (95% C.I. 49.3% - 68.6%)

However, since the program has good community mobilization (active case-finding and follow up) it is decided to use the period coverage as OTP coverage. The SQUEAC assessment found period coverage of 59.3% (95% C.I. 49.3-68.6). The result found in this assessment is above the minimum SPHERE standard for the rural community which is 50%. However, a number of steps should be taken to further improve Concern’s CMAM programme coverage and nutritional status of under 5 children in Seleia and Kulbus, as outlined below.

- Strengthen the nutrition screening at community level, through active case finding method supported by rapid mass screening to detect the cases early and to include more cases to the programme.
- The routine data indicated that, most of the defaulters reported from Nov 2011 to Nov 2012 have attended only 1 to 3 follow ups in the programme. The reason was not captured clearly; however, the nutrition team should explain properly to the mothers/caregivers that they should return for follow up every week. To understand the reason for early default and to encourage mothers returning to the programme, the team should conduct home visits in the first absent.
- The main reason for non-attendance to the OTP is mother’s time. It is important to give awareness to fathers/men about the OTPs during education sessions and encourage them to bring their severely malnourished children to the centre. If they have awareness, father could attend when mother is too busy.
- The community volunteer’s strategy is linked with incentives. However, donors are no longer willing to provide incentives for the community. Therefore, Concern should encourage free community participation. The transition from incentive to non-incentive (free community participation) will take some time until the community understands why the incentives stopped and the benefits of their participation for the health and nutrition of the community. It is also important to identify a non-monetary incentive solution together with line ministries and other stakeholders and to review the workload of volunteers to make sure it is in line with what can be expected from a volunteer. It might also be good to look into how these CVs are selected.
• The community in Seleia and Kulbus are dispersed across a large area, and some villages are very far (above 3 hours walk) from the OTP centers, therefore, there is a need to arrange a fortnightly follow up for these communities, especially in the cultivation season, in order to reduce the defaulter rate and increase programme coverage.

• The Ready to use Therapeutic Food (RUTF) supply chain to the programme has been experiencing breakages; there is need to ensure constant supply of the commodity. This will hugely improve programme coverage.

• Provide refresher training for community volunteers, community leaders and traditional healers to improve the coverage and service quality. Additionally, conduct meeting with key informants to inform them about CMAM so that they can refer children if they suspect malnutrition.

• Strengthen the behavior change activities to improve the knowledge and practice of mothers/caregivers in optimal infant and young child feeding practices (i.e. exclusive breast feeding for the first 6 months of child’s life and continue breast feeding at least up to 24 months and complementary feeding for children 6 months to 24 months). Specially, mothers need to understand the benefits of continuing breast feeding even during pregnancy. Mothers should be encouraged to practice exclusive breast feeding for the first 6 months and continue breast feeding at least up to 24 months, together with complementary food.
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1. BACKGROUND

Darfur is one of 6 regions in Sudan, and includes five states, one of which is West Darfur. Prior to the creation of two new states in January 2012, the state had an area of 79,460 km² with an estimated population of approximately 1,007,000 (2006). It shares a border with North Darfur and South Darfur to the north and east; to the west and north lies Chad.

Concern Worldwide has been working in West Darfur State since 2004, implementing Health & Nutrition, Food, Income and Markets and WASH activities in Seleia and Kulbus locations. The Outpatient Therapeutic Programme (OTP) admits and treats severely malnourished children in 9 OTP centers, and those with complications are referred and treated at Inpatient Care (IC) located in Kulbus and Geneina hospitals.

According to the Famine Early Warning Systems Network (FEWS NET), the Sudan Food Security Technical Secretariat, and other relevant line ministries, the Seleia and Kulbus area is classified as a western agro-pastoralist millet livelihood zone. This zone is labeled as a high priority zone, indicating high food insecurity for the population. Poorer households in this zone face chronic food insecurity even in normal years due to poor agricultural practices, very limited labor opportunities and poor market access. Here the key livelihood activities for the poor are rain fed traditional agriculture, sheep and goat rearing, poultry production and migratory labor. Those better-off depend on cattle, sheep and goat rearing and rain fed agricultural practices.2

A Standardize Monitoring and Assessment in Relief and Transitions (SMART) survey conducted in Seleia and Kulbus by Concern Worldwide in October 2012 showed that the global acute malnutrition (GAM) and severe acute malnutrition (SAM) rates were 13.4 % (95% C.I. 10.2- 17.4) and 2.8 % (95% C.I. 1.8 - 4.4) respectively (reported as per the WHO 2006 standards). However, the GAM and SAM rates are lower when NCHS 1977 reference is used. A GAM rate of 12.1% and a SAM of 0.8% reported in October 2012 survey based on NCHS references as shown in the table below for comparison with previous surveys which was analyzed in NCHS reference only. The severity of malnutrition is classified as ‘acceptable’ when the GAM rate is <5%, ‘poor’ when the GAM rate is 5-9%, ‘serious’ when GAM rate is 10-14% and ‘critical’ when GAM rate is >15%.3 The estimated prevalence can give an indication of the caseload expected in the location.

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3 WHO 2000
Objective of the Assessment

The overall purpose of the assessment was to estimate the coverage of the CMAM programme; to strengthen the routine programme monitoring with the aim to increase the programme coverage in future; and finally to allow the team to practice lessons learned from the first SQUEAC survey in Mornie in West Darfur conducted in October 2012. The specific objectives of the Seleia/Kulbus assessment were:

Specific Objectives

- To assess the overall coverage of the ongoing nutrition programme (OTP) implemented by Concern in Seleia and Kulbus locations.
- To identify barriers to access and uptake of the CMAM services provided by Concern.
- To highlight ways to improve access to the CMAM services and increase programme coverage in the project areas.
- To build the capacity of Concern and SMoH staff on the SQUEAC methodology to assess the coverage of CMAM programme in the future.

Participants of the training and data collection

A total of 10 staff were trained on SQUEAC methods, including five from Concern Darfur, four staff of the Geneina Ministry of Health and one staff member from HAC Geneina.

2. METHODOLOGY

The Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) tool was developed to provide an efficient and accurate method for identifying existing barriers to accessing nutrition services and

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4 Mark Myatt, Daniel Jones, Ephrem Emru, Saul Guerrero, Lionel Fieschi. SQUEAC & SLEAC: Low resource methods for evaluating access and coverage in selective feeding programmes.
assessing coverage in emergency as well as non-emergency contexts. This approach places a relatively low demand on logistical, financial and human resources to provide detailed information regarding overall coverage, areas of low and high coverage and the principle factors preventing higher coverage in targeted areas.

In the West Darfur context, Concern hopes that by building SMoH capacity, the SQUEAC method can be integrated into MoH programming in a sustainable manner; rather than solely functioning as a short-lived, INGO-funded programme monitoring tool. A method previously available such as the Centric Systematic Area Sampling (CSAS) creates a far larger demand on resources and therefore cannot be viably integrated into MoH run programmes in the long-term. The SQUEAC method was used to assess the CMAM programme coverage in Seleia and Kulbus.

This assessment was based on the principle of triangulation. This means that data was collected and validated by different methods (routine data analysis, community interviews & focus group discussions (FGDs) and small and large area surveys) and different sources (routine programme data, community perception and understanding about the program and the current nutritional status of children and enrolment in the programme). The assessment used a three stage approach:

Stage One: Development of the ‘Prior’ (initial estimate of programme coverage based on an internal mapping exercise to identify the positive and negative factors which affect coverage) based on the routine programme data.

Stage Two: Confirms the location of areas of high and low coverage and the reason for coverage failure identified in stage one using small studies or small area surveys. Information stated as a hypothesis to test the spatial distribution of coverage.

Stage Three: Development of the ‘Likelihood’ (assessment of coverage based on the wide area survey findings). Finally, the ‘Posterior’ (programme coverage based on the combined result of prior and likelihood) generated.

The first two stages (analysis of qualitative and quantitative programme data and conducting small area survey) aimed at identifying potential barriers and providing initial estimations of coverage. During the Prior building process, in which the existing routine data which previously collected and compiled was combined with the qualitative data, a coverage “picture” was produced using the xMind software. Building the Prior provided a projection of coverage levels for both the entire target area and also on specific areas suspected of relatively high or low coverage within the programmes target area.

In the third stage the Likelihood was built by conducting a wide area field survey in randomly selected villages. The Active and Adaptive Case Finding method was used to identify severely malnourished children as well as children enrolled in the programme who were still malnourished or recovering. During the wide area survey, additional qualitative data was collected in order to understand why some severely malnourished children were not enrolled in the OTP. Finally, posterior was generated by combining the two initial stages (Prior and Likelihood) to provide the overall coverage estimation. The Posterior was calculated using the Bayesian calculator.
3. RESULTS

3.1. Stage one

The first stage of SQUEAC investigation began with an analysis of routine programme monitoring data which included admissions, exits and data that is already collected on beneficiary record cards such as admission by MUAC, information on defaulters and exit performance indicators. In addition to the routine programme data qualitative data was collected by the teams from CMAM programme areas.

The objective of Stage One was to identify areas of low and high coverage and the reasons for coverage failure using routine programme data.

Enumerators on routine data collection, Photo by Lubaba Hussen, Nutrition Programme Manager

3.1.1. Routine data analysis

Programme Admissions

Among the Concern’s nutrition programme areas, Seleia and Kulbus have the lowest number of admissions. Other Concern CMAM programmes are in IDP camps which have high population density. Generally, the caseload increases in all areas during the hunger gap period (May to September) due to households experiencing a higher level of food insecurity, coupled with a high disease incidence. The generally poor feeding practices further deteriorate due to the mothers’ engagement in agricultural practices.

The routine data analysis covers a one year period, from Nov 2011 – Nov 2012. In this period, the programme admitted 810 children to its nine operational OTPs. The admission clearly increased in May due to the beginning of the hunger gap; however, admissions were low in July due to the involvement of mothers in agricultural activities, with fewer resultantly bringing their children to the center. The rain usually starts end of June and mothers are in their farm throughout July for planting and weeding. Additionally, due to a funding gap there was no community level nutrition screening in July by Concern staff and community volunteers. In August new admissions peaked. The evolution of the overall admissions into Seleia/ Kulbus OTP is illustrated in Figure 2 below.
Admission by OTP site

The overall admissions to the programme were further analyzed by OTP site in order to identify potential differences in admissions across the different sites.

Figure 3: Admissions by OTP, Nov 2011 - Nov 2012, Seleia and Kulbus

According to the above graph, the caseload was distributed relatively equally in all OTP sites in Seleia and some sites in Kulbus (the series highlighted in red) except Adarib and Batro in Kulbus (series is green). In Seleia all OTPs are attached to primary health care units, therefore, when children come for treatment, the health workers refer them to the OTP if malnutrition is suspected. In Batro center in Kulbus some of the villages are far and beneficiaries walk 3-4 hours. Adarib centre is close to surrounding villages; however, the population is less and dominated by pastoralist families. Children in these areas thus have access to milk and dairy products, and malnutrition prevalence seems to be correspondingly low.
MUAC at admission

A total of 664 OTP patient cards were included for routine data analysis, of which 48% of children were admitted by WHZ scores (MUAC >=115 mm), while 51% were admitted by MUAC criteria. The measurement and recording of MUAC at admission is routine and therefore it is possible to use this information to investigate the timeliness of treatment seeking behaviors.

For this the MUAC measurement was plotted for all 341 MUAC admissions. The median MUAC at admission was 103 mm and the mean MUAC was 109 mm. The median MUAC on admission can be used as an indicator of beneficiaries' treatment-seeking behavior. More specifically, it reflects how early or late they seek care. A higher MUAC score indicates that care has been sought early, whilst lower MUAC scores indicate that nutrition has deteriorated further before care has been sought. Overall, in the areas surveyed children had appeared late for treatment, as the median MUAC was 103 mm. A median MUAC <105 mm is considered late\(^5\), because mortality risk increases with low MUAC. This suggests that mothers are not aware of the nutritional status of their children or are busy with different responsibilities such as cultivation, social and family commitments, and thus do not seek nutrition services early.

Figure 4: MUAC status on admission

Programme Exits

\(^5\) Reference-www.en-net.org.uk-under Coverage assessment - Re: MUAC analysis (Lio, 15 Mar 14:30)
Programme exits met SPHERE standards in most of the months of the year, with the proportion of discharges from outpatient therapeutic care who died at <5%; recovery rate at >75% (except one month which reported 70%); and a defaulter rate of <15% (except two months which reported >15%). The drop in recovery rate in May was due to increased number of defaulters as May was the beginning of agricultural activities, when mothers usually give priority for cultivation. Therefore, during this period, the defaulter rate increases and the quality of feeding practices is reduced. The following graph presents cumulative programme performance indicators for the period Nov 2011 – Nov 2012.

**Figure 5: Graph of programme performance over time-Nov 2011-Nov 2012**

![Graph of programme performance over time-Nov 2011-Nov 2012](image)

**Review of Defaulter Records**

To understand the factors contributing to the defaulter rate and potentially affecting coverage, beneficiary cards of defaulted children were analyzed. According to the national CMAM guideline, when beneficiaries are absent for three consecutive visits, they are considered a defaulter. The overall defaulter rate between November 2011 and November 2012 was 7.9%. The rate is below the minimum SPHERE standard of 15%. However, the defaulter rate was higher (>15%) in May and July. This can be attributed to mothers’ involvement in agricultural activities resulting in a lack of time to take the child to the OTP.

Individual MUAC at the time of defaulting was analyzed in order to understand the nutritional status of children at the time of defaulting. Some children defaulted with MUAC less than 110mm. There is a need to increase mother’s/caregivers awareness on the benefit of continued treatment until the child reaches the target weight. Mortality risk increases with low MUAC (<105 mm), therefore, defaulter follow up is important to bring the children back to the programme to complete the treatment and to understand the reason of defaulting for future programme adjustments. Additionally, defaulter follow up will help to understand how many of them are confirmed defaulters, and whether any subsequently died. However, most children defaulted with a MUAC above 110 mm. Therefore, it is important to improve the service quality by providing information on the benefit of completing treatment until the child has fully recovered. Mothers are usually busy with home chores and other responsibilities,
therefore, waiting time in centers should be short, and information should be provided in case of any programme changes.

Figure 6: MUAC at the time of defaulting

![MUAC at the time of default](image)

**Time of defaulting**
The timing of defaulting was analyzed in order to determine possible reasons behind it. OTP patient cards of defaulted children were gathered and separated into categories according to number of visits recorded (Figure 7). The analysis concluded that most defaulting is occurring early, with most defaulters never returning after the 1st, 2nd and 3rd visits. The trend line shows a clear picture of defaulting at early stages. The main reasons might be the improvement of the child’s health status, movement of populations between Sudan and Chad, and long distance to the OTPs.

Figure 7: Time of defaulting, overall, Nov 2011 - Nov 2012

![Time of defaulting, overall, Nov 2011 - Nov 2012](image)
3.1.2. Qualitative data collection and findings
The qualitative methods used in the survey were focus group discussions (FGD) with MoH, Concern staff and mothers/caregivers of children admitted to OTP and semi-structured interviews with key informants (Sheiks, Traditional Healers and Traditional Birth Attendants (TBAs)). Based on the findings from routine data analysis, and information gathered from communities, areas with low and high coverage were identified and hypotheses developed. Reasons for poor coverage were additionally identified through conducting a ‘small area survey’ (stage 2).

The aim of collecting qualitative data was to allow development of coverage hypotheses based upon a more nuanced and in-depth analysis than that produced by quantitative survey data only. This data also provides vital information concerning the underlying causes of low or high coverage, including key barriers and accessibility of the services.

3.1.3 Findings from the Key Informant Interview (KII)
KII method was used with relatively homogeneous groups of key informants that are members of the general population. Sheiks/Village leaders, Traditional Birth Attendances (TBAs), and Traditional healers were interviewed.

Traditional Healers
Nine Traditional Healers, including five in Kulbus and four in Seleia were interviewed. Eight of them were found to be aware of the CMAM programme; however, one was unaware. From the eight who were aware of the programme, four (50%) heard about it from Community Volunteers and the other 4 have heard from beneficiary mothers. All nine healers mentioned that they do not treat malnutrition. However, seven of them reported mothers bring their children for other illnesses like cutting tonsils and they are still providing services to communities.

Traditional Birth Attendants
Nine TBAs (five in Kulbus and four in Seleia) were interviewed. Seven of them were aware of the causes of malnutrition, which include diseases, food shortages and poor feeding practices. One interesting issue which came up in survey findings was that TBAs and communities believed that if a mother continues to breast feed her child during pregnancy, the breast fed child will develop malnutrition. Due to this perception most mothers do not breast feed their children while they are pregnant. Stopping breast feeding suddenly can lead to child malnutrition, as the child is not weaned properly. Moreover, for a child 0 to 6 months breast milk supplies all the energy needs, for a child 6 to 12 months breast milk continues to supply about half of the energy needs and for a child 12 to 24 months breast milk continues to supply about one third of the energy needs

Sheiks (Village Leaders)
In total 9 Sheiks were interviewed (5 in Kulbus 4 in Seleia) regarding their perception of CMAM services. Eight Sheiks had a good knowledge of the programme, while one was unaware of the service. When asked how they know about the programme, all of them mentioned different sources i.e. attending CMAM training, programme staff telling them, beneficiary mothers telling them in the villages. They all mentioned they can recognize children with SAM, and when they see them they advise the mother to go to OTP. They also mentioned various causes of malnutrition including poor feeding practices and
disease. They also know the work of Community Volunteers (CVs) and are in regular contact with them. There were no stigmas reported by the Sheiks that are linked with malnutrition.

**Semi-StructuredInterview (SSI)**

SSIs were used for small and wide area surveys for the mothers/caregivers of the current cases that were not attending the programme. A list of questions was developed and used in interviewing the community members and caregivers, and is attached as Annex 1.

**Findings from OTP Mothers**

In six groups, 42 OTP mothers participated in FGDs. Most mothers mentioned that their children were in the programme for between two and seven weeks and they are observing good progress on their child’s nutritional status. When they asked how they found out about the programme, majority said from Concern staff, some from Community volunteers and from other mothers. Most mothers were able to mention the causes and some of the signs of malnutrition correctly. From the total mothers involved in the FGD, almost a quarter of children in the OTP were found to have been previously admitted to the programme, suggesting that the underlying causes of malnutrition were not being addressed.
Findings from Community Volunteers FGD
There were 114 CVs in the two locations, however, due to lack of incentives some of them are not working actively. In total thirty community volunteers in eight groups participated in the FGD. The CVs receive a refresher course twice a year (every six months). All were able to correctly identify the admission criteria and causes of malnutrition. All the 8 groups reported that they had conducted MUAC screenings in the previous week.

The CVs mentioned that some mothers are not willing to allow their child’s MUAC to be measured as they believe that the child will lose weight or become malnourished if they undergo a MUAC screening. The CVs are expecting incentives for their involvement in the programme, and mentioned that Concern had stopped paying incentives from the beginning of 2012, and that they were not willing to work without incentive as they have other responsibilities. Additionally, they suggested additional trainings need to be conducted and stationary for referrals should be provided on a regular basis.

Findings from Concern OTP Staff
All of the OTP staff were able to correctly identify the admission and discharge criteria, as well as the treatment protocols of OTP. They said that they are getting adequate training from the organisation and support from their managers to run the OTP. When asked if they face any challenges, they said that communities in Seleia and Kulbus are dispersed across a wide area, and that most communities move from place to place with their livestock. Therefore, most beneficiaries walk long distances to access the OTP, and this, in addition to supply shortages, were the main reasons which contribute to elevated defaulter rates. Concern sources Plumpy nut from UNICEF as in kind donation. However, the programme faced shortages in May, June, July and October. The reason for the supply breakage was UNICEF running out of stock in country and transporting the supply from Khartoum to West Darfur was a challenge due to insecurity. The team also mentioned that staff shortages is one of the problems, since the nutrition team is composed of a supervisor, a nurse and two nutrition workers only. When asked, if the programme is benefiting them and the community, they stated that the programme saves lives by treating severe acute malnutrition and reduced mortality and morbidity linked to malnutrition in their communities. The team also mentioned due to the staff shortage in nutrition team and all the working days tied up in distribution the nutrition screening is poor; the last nutrition screening conducted by nutrition staff in both Seleia and Kulbus was in November 2012.

To improve programme quality they advised:
• Opening additional OTP sites in remote villages would improve programme coverage and early detection of cases
• Providing frequent training for staff and community volunteers would improve the understanding of protocols and to improve the service quality.

Findings from MoH Staff
Seven MoH staff participated in FGDs in Kulbus and Seleia. All of them correctly identified the admission and discharge criteria as well as the treatment protocols of OTP and IC. They also identified poor feeding
practices, disease and lack of knowledge as the causes for malnutrition. When asked if they have enough materials/supplies for work, they said yes, but noted that they sometimes face shortage of medicines in the Inpatient Care as these are not provided by MOH frequently. They also mentioned some defaulters from IC as mothers have other children in the house in need of care, and that some beneficiaries are coming from Chad who later default, with no means to trace them.

To improve quality of the programme they advised:
- Increasing the incentives package for MoH staff
- Improving the health and nutrition education at OTP and IC for beneficiary mothers to improve the feeding practices of under 5 children.
- Concern should provide medicines for IC since MOH can’t afford to supply regularly

Seasonal calendar
In order to get a broader picture of programme performance against context, a seasonal calendar was developed including agricultural labour, disease and food availability seasons. Admissions and defaulter trends were then compared to the seasonal calendar to determine whether the programme was responding to seasonal changes and context-specific factors.

Figure 9: Admissions and programme performance
3.1.4 Developing a Prior

Information that was collected from different sources through various methods was plotted on the ‘Mindmap’ (Figure 8) in order to verify and triangulate findings. The information was later transferred to the X-Mind software.

Figure 8. Mind map

All the positive and negative factors identified affecting the coverage were listed, ranked and weighted according to their relative contribution to the overall coverage. Positive and negative factors ranked highest were automatically given a ±5% weight while lowest ranked factors were weighted ±1%. The scoring was done by the assessment team, based on weight of each element, they have used a scale from 1-5 to score the positive/negative elements (table 2).

The positive and negative weights for the factors were then added up. The positive factors were added to the minimum possible coverage (0%) while the negative factors were subtracted from the highest possible coverage (100%).

Table 2 measuring contributing factors (Prior)

<table>
<thead>
<tr>
<th>Positive factors</th>
<th>Values</th>
<th>Values</th>
<th>Negative factors</th>
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<tbody>
<tr>
<td>Security</td>
<td>4</td>
<td>1</td>
<td>Insecurity</td>
</tr>
<tr>
<td>Decentralized OTP</td>
<td>3</td>
<td>3</td>
<td>Staff shortage</td>
</tr>
<tr>
<td>Trained staff</td>
<td>3</td>
<td>2</td>
<td>Lack of understanding of protocols</td>
</tr>
<tr>
<td>Supply availability</td>
<td>4</td>
<td>2</td>
<td>Supply shortage</td>
</tr>
<tr>
<td>Weekly follow up</td>
<td>5</td>
<td>3</td>
<td>Lack of CV’s participation</td>
</tr>
<tr>
<td>Staff behaviour</td>
<td>4</td>
<td>4</td>
<td>Seasonal activities</td>
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<tr>
<td>Community awareness about the</td>
<td>3</td>
<td>2</td>
<td>Long distances</td>
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The ‘Prior’ is generally set using the prior information to make an initial guess about the most likely coverage value and express it as a probability density. The ‘Prior’ was calculated using findings from the small area survey and information gathered through ‘Mind map’. The Prior was then described using the probability density Alpha prior = 28.7 and Beta prior = 23.1 using Bayesian SQUEAC software.

The distribution of prior coverage estimate was determined through a beta distribution of the belief of perceived coverage estimates. This was done by using the Bayes SQUEAC calculator to plot the mode and all the perceived other possible coverage proportions. An average was calculated and used as the median for a trial distribution curve (Prior) plotted using the Bayes SQUEAC Calculator. The final curve that was generated is as shown in figure 10.

**Figure 10. Prior of programme coverage**
3.2. **Stage two**

The objective of Stage two was to confirm the locations of areas of high and low coverage as well as the reasons for coverage failure identified in Stage One (above) using small area surveys. Sixteen villages were sampled where eight were hypothesized as having high admission and the other eight low admissions. Four teams were formed for the small area survey which was conducted in one day.

3.2.1. **Active and adaptive case finding**

**Active** = Target SAM cases instead of doing house to house screening  
**Adaptive** = Use key informants to help find SAM cases  
Key informants:  
- Village leaders/sheiks  
- Traditional healer  
- Traditional Birth Attendants (TBAs) and  
- Beneficiary caregivers.

**Case Definition**

The case definition used by the Seleia/Kulbus coverage survey; a case was defined as “a child fitting the admission criteria of the programme”. The admission criteria of Sudan CMAM programme include children aged between 6 and 59 months with at least one of the following criteria:

1. A Mid Upper Arm Circumference (MUAC) < 11.5 cm  
2. <-3 Z score, WHO 2006  
3. Bi-lateral pitting oedema

However, for this assessment, the local term was used for case (SAM) finding. No pictorial image was used, since due to the on-going CMAM programme, communities are familiar with symptoms of malnutrition.

**Local names for malnutrition in Kulbus and Seleia**

- Marasmus is known as ‘Deif’  
- Oedema is known as ‘Worem’

In this survey, the criterion of Z-score was not considered to identify cases. Z-score is a criterion generally used at Nutrition centre level. Also in regular screening by CVs’ to identify acute malnutrition cases Z-score is not used. Therefore, only a MUAC<11.5 cm and the presence of bilateral pitting oedema were considered in the case definition for SQUEAC assessment.

Based on the information collected, coverage was classified against a threshold of 50%. A decision rule (d) was calculated using the following formula:

\[
\text{d} = \left[ \frac{n \times p}{100} \right]
\]
n = total number of cases found  
\( p = \) coverage standard set for the area

For the test of the hypothesis for high coverage areas, the below calculations were made:

### 3.2.2 High coverage areas

Total SAM found = 4; IN programme = 4; NOT in programme = 0; \( D = \frac{50}{100} \times 4 = 2 \)

Since 4>2, then coverage is above 50% and the hypothesis was accepted.

### 3.2.3 Low coverage areas

Total SAM = 4; IN programme = 0; NOT in programme = 4; \( D = \frac{50}{100} \times 4 = 2 \)

Since 0<2, then the coverage is below 50%.

The actual numbers for each village are represented in the table below.

**Table 1: Results of the small area survey**

<table>
<thead>
<tr>
<th>Villages</th>
<th>SAM cases found</th>
<th>Cases in programme</th>
<th>Cases not in programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>High coverage villages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abulugma</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HilletAgid</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Andusa</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Umsayala</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Negater</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Simeme</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Arosharow</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Geref east</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tembusanat</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nahda</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Nermela</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hajelija</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low coverage villages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feyafi</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Imtidad</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Himeda</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Manjura Tat</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8</strong></td>
<td><strong>4</strong></td>
<td><strong>4</strong></td>
</tr>
</tbody>
</table>

### 3.3. Stage Three

The objective of Stage 3 was to provide an estimate of overall programme coverage using Bayesian techniques. To do this, the evaluation relied on the standards Bayesian beta to binomial conjugate analysis.
3.3.1 Sampling Methodology

3.3.1.1 Minimum Sample Size
To estimate the minimum number of cases (children) needed in the small area survey (n), the following formula is used:

\[ N = \frac{\text{Mode} \times (1-\text{mode})}{(\alpha + \beta - 2) \times \left(\frac{\text{Precision}}{1.96}\right)^2} \]

Using \( \alpha (28.7) \) and \( \beta (23.1) \) values and a mode of 56% (see section 3.1), the following minimum sample is as follows:

\[ N = \frac{0.56 \times (1-0.56)}{(28.7 + 23.1 - 2) \times \left(\frac{0.1}{1.96}\right)^2} \]

\[ N = \frac{0.56 \times 0.44}{49.8} \]

\[ n = \frac{94.66 - 49.8}{n = 44} \]

In order to achieve a confidence of +/- of 10%, a minimum of 44 cases needs to be identified.

3.3.1.2 Minimum number of villages
The minimum number of villages to be sampled was then calculated with the use of the following values:

<table>
<thead>
<tr>
<th>Target Sample size</th>
<th>44</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average village population</td>
<td>766</td>
</tr>
<tr>
<td>Prevalence of SAM</td>
<td>2.8%</td>
</tr>
<tr>
<td>% of children 6-59 months</td>
<td>18%</td>
</tr>
</tbody>
</table>

\[ n \text{ villages} = \frac{n \times \text{average village population} \times \text{percent of population 6-59 months}}{100} \times \text{prevalence/100} \]

\[ n \text{ villages} = 44/ (766 \times 0.18 \times 0.028) \]

\[ n \text{ villages} = 44/3.86064 \]

\[ n \text{ villages} = 11.4 \text{ villages} \]

As a result, a minimum of 12 villages has to be sampled in order to reach the minimum sample size of children. However, in practice, from the small area survey 8 SAM cases were found from 16 villages that
was an average of 0.5 children was identified in a village. Therefore, the team had to increase the villages sampled to a total of 52 villages to obtain at least above 50% of the required sample size of 44.

**Spatial Representation**

In order to achieve spatial representation, the Stage Three investigation involved a two-stage sampling:
1) Village selection: First, a list of all the villages in the catchment areas was generated, since the team wanted to have more villages at the sampling stage, 52 villages were selected from the map.
2) Within-community sampling method: a combined active & adaptive case-finding method was used in Stage Three to ensure selected communities were sampled exhaustively. The wide area survey was carried out over three days (2\textsuperscript{nd}-5\textsuperscript{th} February) by four teams of two people, each team composed of a team leader and an enumerator.

**3.3.2 Wide Area Survey Results**

Main results for the wide area survey summarized in the below table.

**Table 3: Stage Three (wide area survey) main findings**

<table>
<thead>
<tr>
<th>Types of cases</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of current (SAM) cases</td>
<td>26</td>
</tr>
<tr>
<td>Number of current (SAM) cases attending the programme</td>
<td>8</td>
</tr>
<tr>
<td>Number of current (SAM) cases not attending the programme</td>
<td>18</td>
</tr>
<tr>
<td>Number of recovering cases attending the programme</td>
<td>23</td>
</tr>
</tbody>
</table>

**3.3.2.1. Main barriers affecting the programme coverage**

Contextual information showed that in remote OTP centres/sites, poor screening to identify cases by the CVs, mother’s workload during planting season and periodic shortages of RUTF supply are the main reasons of coverage failure.

There were 18 SAM cases found that were not attending the OTP. Mother’s/caregivers were questioned the reasons of SAM cases that were not attending the OTP, as well as their perceptions about the OTP. From the total 18, the questionnaire was filled for 17 as one data was missing.

**Table: 4. Mothers/caregivers of SAM cases knowledge of the programme**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes - # (%)</th>
<th>No -# (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is your child malnourished</td>
<td>16 (94)</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Do you know a programme that can help your child</td>
<td>12 (71)</td>
<td>5 (29)</td>
</tr>
<tr>
<td>Was your child previously attending the programme</td>
<td>4 (27)</td>
<td>11 (73)</td>
</tr>
</tbody>
</table>
When asked, which programme can help your child, 4 of them mentioned SFP & OTP, while the majority 8 mentioned OTP. Two cases (SAM) that were in the programme before had defaulted, 1 had relapsed and the other one was discharged as a non-responder. The main reasons for not attending CMAM services available are summarized in the table below.

**Figure 11: Main reasons for Non-Attendance**

<table>
<thead>
<tr>
<th>Reason</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too far</td>
<td>2</td>
</tr>
<tr>
<td>Family sickness</td>
<td>3</td>
</tr>
<tr>
<td>Mother too busy</td>
<td>10</td>
</tr>
</tbody>
</table>

**3.3.3 Overall Coverage Estimation**

Point coverage is presented as it provides a more accurate picture of the actual coverage of SAM cases at the time the assessment was conducted. **However, since the program has good community mobilization (case-finding and follow up) it is decided to use the period coverage.**

**Point Coverage**

Point coverage provides a snapshot of programme performance and places strong emphasis on the coverage and timeliness of case-finding and recruitment. To calculate point coverage, the numerator and the denominator were selected from the results of the wide area survey using the formula

\[
\text{Point Coverage} = \frac{\text{No. of current (SAM) cases attending the programme}}{\text{No. of current (SAM) cases}}
\]

To estimate the ‘Point’ coverage, data from the Wide Area Survey was used. Estimation was made, using the BaysienSQUEAC Calculator. ‘Coverage’ as denominator (26) and numerator (8) was entered to BaysienSQUEAC calculator (use survey data) while same Alpha and Beta values has been (α 28.7 β – 23.1) used from the ‘Prior’ which was set to estimate the sample size for ‘Wide area survey’.

---

6 Please note that, the formulas indicated for both point and period coverage is giving the likelihood result, however, the results reported are a combination of prior and likelihood, it is a posterior.
**Period Coverage**

The period coverage includes current cases that are attending the programme, number of recovering cases (because they have not yet met the discharged criteria) and number of current cases that are not in the programme. To calculate period coverage, the numerator and denominator were selected from the results of the ‘Wide-area survey’ using the below formula:

\[
\text{Period Coverage} = \frac{\text{No. of current (SAM) cases and recovering cases attending the programme}}{\text{No. of current (SAM) cases and recovering cases attending the programme} + \text{No. of current (SAM) cases not attending the programme}}
\]

To estimate the ‘Period’ coverage, data from the Wide area Survey was used. Estimation was made using the BaysienSQUEAC Calculator. ‘Coverage’ as denominator (26+23=49) and numerator (8+23=31) was inserted to BayseinSQUEAC Calculator (use survey data) while same Alpha and Beta values has been \((\alpha 28.7 \beta – 23.1)\) used from the ‘Prior’ which was set to estimate the sample size for ‘Wide area survey’.

**GENERATION OF THE POSTERIOR**

Using the prior (56%) and the likelihood (63.3%) Bayes SQUEAC generated the final ‘Period’ coverage level for the Seleia/Kulbus OTP. The posterior or the final coverage value is **59.2% (C.I. 95%: 49.3-68.6%).**
4. CONCLUSION AND RECOMMENDATIONS

Community awareness about the programme is good as most of the community leaders/Sheiks, traditional healers, traditional birth attendants and mothers/caregivers know there is a programme that can help malnourished children in their area. However, there is a lot to be done in the area of community mobilization, providing training for traditional healers on MUAC measurement and encouraging referring SAM cases to the programme as soon as mothers bring malnourished children for their attention. Moreover, the active case finding method has been found to discover almost all of the SAM cases in the community; therefore, the nutrition team, community coordinators and community volunteers should follow the active case finding method to capture more cases instead of using mass screening which is extremely time consuming and does not necessarily capture more cases, as some mothers will not bring sick children to the screening place.

Mother’s time appears to be the main issue that affects the programme coverage negatively. According to the CMAM data, Seleia and Kulbus area have a small number of admissions, higher defaulter rate and low coverage compared with other Concern programme areas in West Darfur. However, the SAM rates themselves was similar to other locations. The SQUEAC assessment found period coverage of 59.2% (95% C.I. 49.3-68.6). The result found in this assessment is above the minimum SPHERE standard for the rural community which is 50%. However, a number of steps should be taken to further improve Concern’s CMAM programme coverage and nutritional status of under 5 children in Seleia and Kulbus, as outlined below.
- Strengthen the nutrition screening at community level, through active case finding method supported by rapid mass screening to detect the cases early and to include more cases to the programme.

- The routine data indicated that, most of the defaulters reported from Nov 2011 to Nov 2012 have attended only 1 to 3 follow ups in the programme. The reason was not captured clearly; however, the nutrition team should explain properly to the mothers/caregivers that they should return for follow up every week. To understand the reason for early default and to encourage mothers returning to the programme, the team should conduct home visits in the first absent.

- The main reason for non-attendance to the OTP is mother’s time. It is important to give awareness to fathers/men about the OTPs during education sessions and encourage them to bring their severely malnourished children to the centre. If they have awareness, father could attend when mother is too busy.

- The community volunteer’s strategy is linked with incentives. However, donors are no longer willing to provide incentives for the community. Therefore, Concern should encourage free community participation. The transition from incentive to non-incentive (free community participation) will take some time until the community understands why the incentives stopped and the benefits of their participation for the health and nutrition of the community. It is also important to identify a non-monetary incentive solution together with line ministries and other stakeholders and to review the workload of volunteers to make sure it is in line with what can be expected from a volunteer. It might also be good to look into how these CVs are selected.

- The community in Seleia and Kulbus are dispersed across a large area, and some villages are very far (above 3 hours walk) from the OTP centers, therefore, there is a need to arrange a fortnightly follow up for these communities, especially in the cultivation season, in order to reduce the defaulter rate and increase programme coverage.

- The Ready to use Therapeutic Food (RUTF) supply chain to the programme has been experiencing breakages; there is need to ensure constant supply of the commodity. This will hugely improve programme coverage.

- Provide refresher training for community volunteers, community leaders and traditional healers to improve the coverage and service quality. Additionally, conduct meeting with key informants to inform them about CMAM so that they can refer children if they suspect malnutrition

- Strengthen the behavior change activities to improve the knowledge and practice of mothers/caregivers in optimal infant and young child feeding practices (i.e. exclusive breast feeding for the first 6 months of child’s life and continue breast feeding at least up to 24 months and complementary feeding for children 6 months to 24 months). Specially, mothers need to understand the benefits of continuing breast feeding even during pregnancy. Mothers should be encouraged to practice exclusive breast feeding for the first 6 months and continue breast feeding at least up to 24 months, together with complementary food.
5. ANNEXES

5.1 Key informant interview and FGD questionnaire

1. Questionnaire: For Traditional Healer (Key Informant interview)

   1. Do you know the programme called OTP؟ هل تعرف أن هذا البرنامج يسمى بـ OTP ؟
   2. If yes, who informed you؟ إذا كانت الإجابة نعم من الذي أخبرك بهذا؟
   3. What do you know about malnutrition؟ بماذا تعرف عن سوء التغذية؟
   4. Is there any case of malnutrition in your community؟ هل يوجد أي حالة سوء التغذية في جمعيتك؟
   5. Do they come to you for treatment/help؟ هل هنالك أطفال يطلبون لتقى العلاج أو المساعدة في العلاج منك؟
   6. How do you treat/ help them؟ كيف تعالجهم أو تساعدهم في العلاج؟

2. Questionnaire: For Traditional Birth Attendance - (Key Informant interview)

   1. What do you do with malnourished children؟ ماذا تفعل للاطفال الذين لديهم سوء تغذية؟
   2. Is there any child you treated who had signs of malnutrition؟ هل هناك أي طفل لديه علامات سوء التغذية شديدة أو يمكن الأطفال بسكويت خواجة؟
   3. Do you know OTP (RUTF)؟ هل تعرف البرنامج الذي يعالج الأطفال الذين لديهم سوء تغذية شديدة أو يعطيب الأطفال بسكويت خواجة؟
   4. Did you refer any children to this programme؟ هل قمت بتحويل أي طفل لهذا البرنامج؟
   5. Do you know the causes of malnutrition؟ هل تعرف ما الذي بسبب سوء التغذية للأطفال؟
   6. Do you know mother that has children with malnutrition who refused to go to the prog؟ هل تعرف ام لها اطفال مصابين بسوء التغذية ولكنها رفضت النزول إلى البرنامج؟

3. Questionnaire: For village leader - (Key Informant interview)

   - Do you know the programme OTP؟ هل تعرف البرنامج الذي يعالج الأطفال المصابين بسوء التغذية؟
   - If yes, who inform you؟ إذا كانت الإجابة نعم من الشخص الذي أخبرك بهذا البرنامج؟
   - What is your role in the programme؟ ما هو الدور الذي تساعده به لهذا البرنامج؟
   - Is their any child in the programme from your village؟ هل هناك أي طفل في هذا البرنامج من حيكم أو قريتكم؟
   - Do you have any m/n children in your village that refuse to go the programme؟ هل لديك اي طفل في حيكم مصاب بسوء التغذية ولكن رفض الذهاب إلى برنامج التغذية؟
   - What are the causes of m/n in your village؟ ما الذي بسبب سوء التغذية للأطفال في حيكم أو قريتكم؟
   - How do you collaborate with the community volunteers؟ كيف تنسق مع المتطوعين في الحي لنجاح البرنامج؟
   - Is there stigma for m/n in your community؟ هل تعتقد الناس في مجتمعكم في أن الإصابة بسوء التغذية من العيب أو قضية؟
4. Questionnaire: Volunteers/ OTP Staff (Concern & MoH)-Group discussion

How CMAM works:

- What are the criteria for this program?
- Who are the beneficiaries of the program?
- What are the causes of Malnutrition?
- Do you have enough material/supplies for the work?
- Do you do sensitisation with population?
- When is the last time you did the screening?
- Are there many cases of malnutrition?
- How do you collaborate with the health centers?
- Do you get feedback on your work/report?
- Are there any children who refuse to go to OTP?
- What is your appreciation of the program?
  - Benefit you have seen from the program
  - Problem you face
  - Does the OTP programme cause work load for you?

Develop seasonal calendar
- Any suggestion to improve the programme?

5. OTP mothers:

- How long is your child in the programme?
- How do you know about this programme?
- Do you know why your child is in the OTP?
- What was the cause of his/her condition?
- Did your child admitted before in OTP (this one)?
- Any of your other child admitted to OTP before?
- If yes, for how long?
- Is this programme helping your child to get better?
- Will you refer other child in this prog, if you find them ‘Dief’/Worem?
5.2. SQUEAC SURVEY-Seleia and Kulbus Concern Sudan Survey Tally sheet

<table>
<thead>
<tr>
<th>#</th>
<th>Child’s Name</th>
<th>Caregivers name</th>
<th>Village/camp</th>
<th>MUAC (CM)</th>
<th>Oedema (Y/N)</th>
<th>SAM cases in prog. (cases before)</th>
<th>Non cases Inprog. (cases before)</th>
<th>Age (months)</th>
<th>Sex (M/F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>11</td>
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<td></td>
</tr>
</tbody>
</table>

Please Tally all children you measured
5.3 Survey Questionnaire for caretakers with cases NOT in the programme

Location: ___________________ Village: ________________ Date: ____________

Child Name: ___________________ Team Leader: ________________

1. DO YOU THINK YOUR CHILD IS MALNOURISHED (sick, thin, have oedema on both legs)?

☐ YES ☐ NO

2. ARE YOU AWARE ABOUT THE EXISTENCE OF A PROGRAMME WHICH CAN HELP MALNOURISHED CHILDREN?

☐ YES ☐ NO (stop)

If yes, which programmes?

__________________________

3. WHY DID YOU NOT TAKE YOUR CHILD TO THAT PROGRAMME?

☐ Too far (How long to walk? ........hours) 

☐ No time / too busy

Specify the activity that makes them busy this season ______

☐ The mother is sick

☐ The mother cannot carry more than one child

☐ The mother feels ashamed or shy about coming

☐ No other person who can take care of the other siblings

☐ The amount of food was too little to justify coming

☐ The child has been rejected. When? (This week, last month etc) _______________

☐ The children of the others have been rejected

☐ My husband refused

☐ The mother thought it was necessary to be enrolled at the hospital first

☐ The mother does not think the programme can help her child (prefers traditional healer, etc.)

__________________________
4. WAS YOUR CHILD PREVIOUSLY ADMITTED TO OTP/SC PROGRAMME?
هل تم ادخال الطفل في برنامج المعالجة الخارجية أو الداخلية من قبل؟
☐ YES نعم
☐ NO لا => stop!
(=> اوقف اجراء المقابلة)
If yes, why is he/she not anymore enrolled?
اذا كانت الإجابة نعم، لماذا لم يكن هو/هي الان في البرنامج؟
☐ Default, When? ...................Why? ...................
هروب، متى ولماذا؟
☐ Discharged cured by the programme (when? .............)
تم اخراجه من البرنامج في حالة الشفاء التام، متى؟
☐ Discharged non-cured (when? .............)
تم اخراجه لعدم استجابته للعلاج، متى؟
☐ Other:________________________________
اخر
(Thank the mother/carer  قدم الشكر للام)