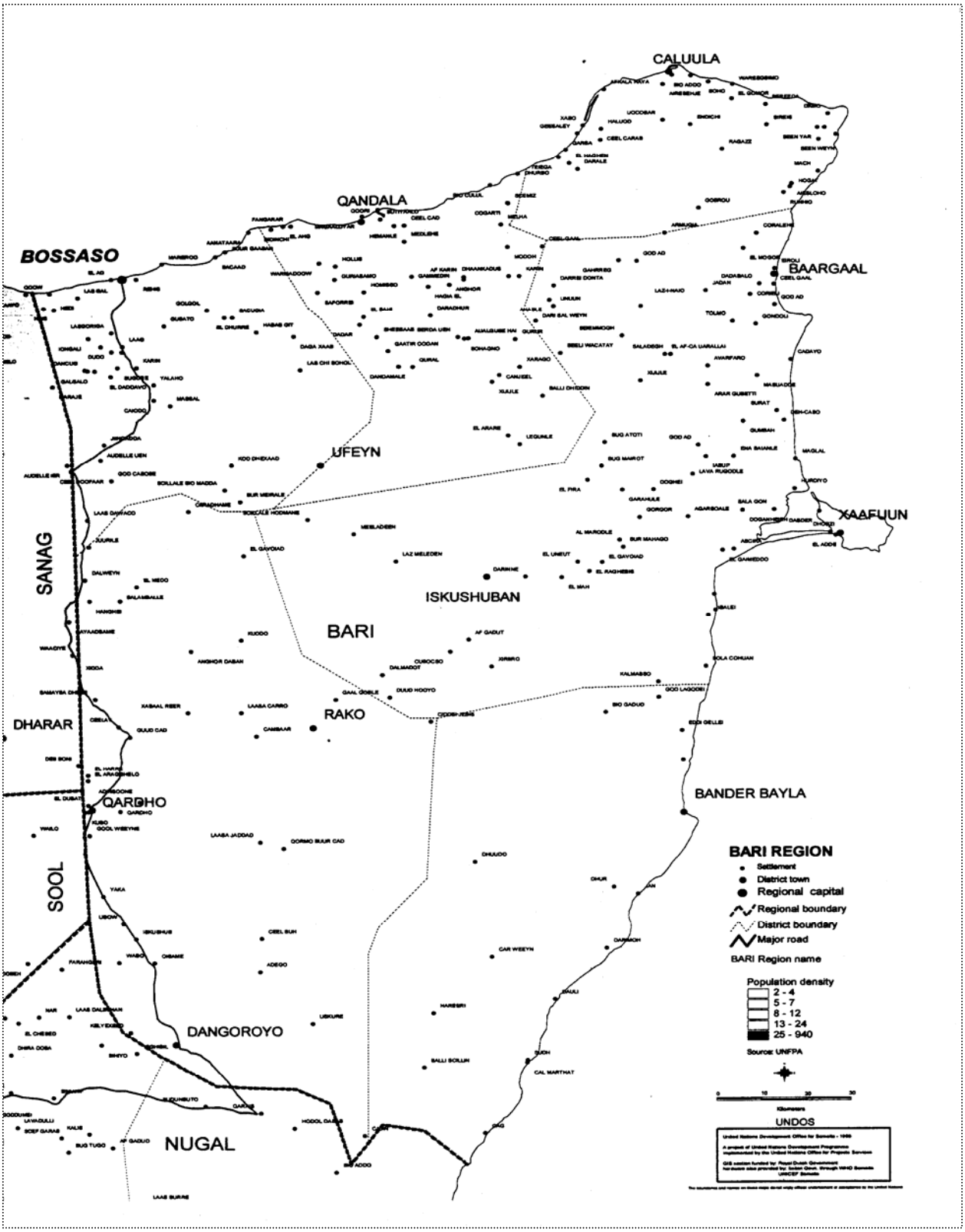
Nutrition Survey Report
Kandala, Allula, Bargal & Iskushuban districts
Bari Region
Noth/East Somalia

September 2002

unicef
United Nations Children's Fund

Map of Bari Region



Acknowledgment

UNICEF wishes to thank the Ministry of Social Affairs (MOSA) and the Kandala, Allula, Bargal and Iskushuban Mayors for facilitating the fieldwork in their respective districts amidst security uncertainties.

UNICEF is grateful to all enumerators and supervisors who provided invaluable inputs and participated in the survey and to FSAU for providing contextual information relating to food security and participating in actual nutrition survey fieldwork.

The data could not have been obtained without the cooperation and support of the communities surveyed especially the mothers and caregivers who took time off their busy schedules to respond to the interviewers.

Bossaso, 30 September 2002

Executive summary

UNICEF, in collaboration with MOSA and Food Security Assessment Unit (FSAU), conducted a nutrition survey in Kandala, Allula, Bargal and Iskushuban districts on 26 August-7 September 2002. Beside the main objective of assessing the nutrition status of the under five children using weight-for-height measurements, the survey also sought to determine the potential risk factors associated with malnutrition, the household characteristics and coverage of measles, Polio National Immunisation Days (NIDs) and vitamin A supplementation.

Household and general population characteristics

Of the 598 households interviewed, 86.5% are male-headed; the median household size is 5 (interquartile range 4-7). Almost all (99%) of the study population are residents who rely entirely on purchases (95%) for their food source. Income is derived from frankincense collection/sale (32%) mostly in Allula, casual work (30%) and small businesses (23%). Coping mechanisms revolve around borrowing (88%), purchases (3%) and livestock sale (3%)

Water and environmental sanitation

The Kandala, Allula, Bargal & Iskushuban residents draw their drinking water from berkads (59%), taps/piped water (19%) and open wells (14%). Analysed data suggest that berkads are exclusive source of drinking used in Kandala. More than 60% of the population relieve themselves in the bush/open ground whilst 70% of pit latrines in use were observed to be generally clean.

Nutrition status, feeding practice and risk factors analysis

Nutrition status analysis, using EpiInfo software, of the eligible 951 children, 65-110 cm, suggests severe and global acute malnutrition rates of 2.1% (CI 1.3-3.3%) and 12.6% (CI 10.6-14.9%) weight-for-height (W/H) Z-Scores respectively.

About half (48%) of the 6-23 months old children had stopped breastfeeding as at the time of the survey and with majority (92%) reporting having introduced complementary feeds during the first 6-month period of recommended exclusive breastfeeding. Of those who had stopped breastfeeding, 43% had done so during the first six months of life. However, majority (95%) of the children are fed 3-4 or more times in a day.

Analysis of potential risk factors indicate existence of significant statistical association with global acute malnutrition for diarrhoea (cRR 2.35; p=0.000) and malaria (cRR 1.72; p=0.002):
Children with history of diarrhoea and malaria in the past 2 weeks prior to the survey were respectively at a 2.35-fold and 1.7-fold increase in risk of being acutely malnourished.

There exists a significant association (Chi-square test of association: p=0.001) between district and global malnutrition with a demonstrable statistical significant increasing trend (Chi-square for linear trend: p=0.000) in proportion of acute malnutrition for children from Bargal (7.2%), Iskushuban (8.5%), Kandala (14.7%) and Allula (18.4%) districts respectively.

Health seeking behaviour, morbidity and immunisation

Over three quarter (77%) of families seek medical assistance for their sick child(ren) at private clinic/pharmacy (86%) and public health facility (11%). Whilst lack of money (22%) and lack of health facilities and workers alike (12%) are given as reasons for not seeking medical attention, Quran recitation (66%), however, is cited as an important alternative to seeking medical attention. ARI (49%), malaria (32%) and diarrhoea (26.5%) are important causes of morbidity among the under fives.

Among the 12-23 months old children, 28% had received measles immunisation based on card verification only and 64% by card or history anytime before the survey. Of the infants eligible for measles immunisation, a third had not yet received their jabs as at the time of survey. Survey results suggest 77% vitamin A supplementation coverage.

During the polio NIDs second round conducted on 15-17 April: 82% of the 6-59 months children population received the polio dose (the preliminary second round polio NIDs results give a 88% coverage for Bari region). Of those who missed the April 2nd round 2002 NIDs, half said that the child was not at home, 36% reported that the polio team did not visit at all whilst 24% thought the vaccine was unsafe/unimportant.

Table 1: Summary statistics

	n	*(%)*
Global acute malnutrition (n=951)	120	(12.6)
Severe acute malnutrition	20	(2.1)
Diarrhoea past 2 weeks	252	(26.5)*
ARI past 2 weeks	465	(48.9)
Malaria past 2 weeks	306	(32.2)*
Measles past 1 month	68	(7.2)
Measles immunisation – card and/or history:		
9-11 months (n=71)	42	(60)
12-23 months (n=209)	133	(63.7)
9-59 months (n=900)	600	(66.7)
OPV:		
Last round (April 2002, 2nd round Spring NIDs)	780	(82.1)
3 doses previous year (2001)	376	(39.6)
Vitamin A supplementation (past 6 months)	732	(77)
Are you breastfeeding child (n=325):		
Yes	153	(47.1)
No	156	(48)
Never	16	(4.9)
Age when child stopped breastfeeding (n=156):		
0-6 months	67	(42.9)
7-11 months	39	(25)
12 months or more	50	(32.1)
Weaning age (n=263):		
0-6 months	284	(91.9)
7 months or more	25	(8.1)
Feeding frequency (n=265):		
Once	3	(0.9)
2 times	13	(4)
3 times	125	(38.6)
4 or mores times	183	(56.5)

* Significant statistical association with acute malnutrition

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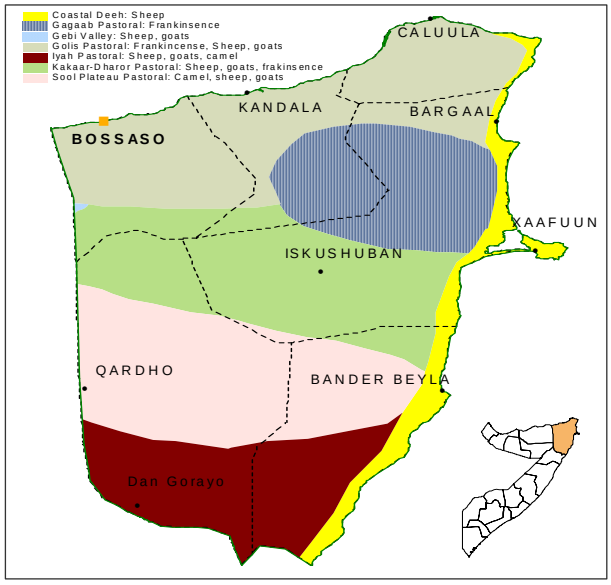
1. Background

Bari is the largest region in Puntland State of Somalia. The region is made up of various districts namely Bossaso, Ufeyn, Dan Goroyo, Gardo, Bender-Beila, Bargal, Iskushuban, Kandala and Allula. In 2001 WHO estimated the population in Bari region to be around 302,000. As reflected on the map, the region has 6 main ecological zones.



The main rainy seasons are Gu (April-June) and Deyr (mid September-November). In addition, the coastal areas receive Xays/Wajine rains between December and mid January. The average annual rainfall is less than 100 mm. The main sources of livelihood in the area are livestock and livestock production, frankincense collection, fishing and trading.

1.1 Food security context

As at the end of August, the overall situation of Bari region was generally normal except some areas where water and pasture shortages persists. These include Dharjaale, Kalabayr, Diriqle, Dhudhub and Hubabeys villages. Normally, these villages obtain water from Berkads. The berkads are empty and the population has to get water from water tankers a price of between SoSh 20,000 – 30,000 per drum up from a normal of SoSh 5000 – 10,000 per drum. Most of the berkads in Sool and Dharoor FEZs were dried leading to animals to congregate near and around areas with permanent water sources.

The livestock condition especially small-ruminants was still satisfactory but milk production had reduced drastically. The condition of camel herds of the concerned areas ranged from fair to poor due to the impact of last drought compounded with the negative effects of the current season. No livestock outbreak diseases were reported.

Herds migrating into the area from the Sool of Gardo and the Iynx plateau of Nugal hastened the depletion of limited pasture resources as well as water contained in Berkads and Ballis of the major grazing areas of Dharoor and the Sool plateau of Bender Beyla. The recent hostilities in Gardo and increased road blocks between along the Bossaso-Garowe highway disrupted market accessibility and reduced human mobility but did not restrict livestock migration patterns and access to resources.

Livestock traders have developed another camel market in Libya. Shipment of 850 head started at the end of July. Nevertheless no other shipments to Libya have so far taken place, making less lucrative than the Egypt market. Currently, it is obvious that concern for food security situation remains high for poor urban groups of Bossaso town and poorest pastorals of Dharoor and Sool plateau FEZs due to the following factors:

- Effects of *Hagaa* winds

- Shortage of water and pasture
- Livestock concentration
- Reduced milk production
- Lack of labour opportunities
- Seasonal sea closure with reduced port activities thus few imports with limited employment option
- High cereal prices and transport costs
- Political instability – multiple road blocks

During August unusual sporadic rain showers throughout Gagaab and Golis range was experienced. Inter-regional livestock movements to the rained areas in search of better pasture and free water occurred.

The value of the Somali shilling dropped by 1.7% while prices of imported food and non-food commodities increased because most of the reserves in the market stores dwindled. According to Bossaso market data, the prices of export shoats and local camel started to rise slightly by 2.5% and 7% respectively due to decrease in supply associated with increasing demands while the price of a local goat remained stable. The milk price escalated further and remained out of reach. One liter of fresh camel milk rose from SoSh 13,600 to 16,000 – approximately 17.5% when compared to the average price of the previous month.

Imported food and non-food commodities are continued to rise due to reduced import volume caused by rough high seas. Retail price of wheat grain increased further by 8% while wholesale prices of rice shot up by approximately 7% (from SoSh 215,000 to 230,000). Similarly there was shortage of domestic cereals (sorghum, maize and cow peas) due to scant supplies from southern regions via the Galkaio route caused by recent conflicts intertwined with increased road blocks along the Bossaso- Garowe highway. This led to increase in prices by 6%, 3% and 6.5% respectively. However, terms of trade of all pastoral areas of Dharoor and Sool eco-zones remain favorable when compared to last year but the purchasing power of urban group is diminishing.

A widespread water shortage was experienced over the primary grazing areas of Iskushuban and Bender Beyla districts. The affected areas were Uur Aleed, Aboob, Karkaar hoose, Sarmaan Qoodad, Kodmo madow and Iyah of Beyla.

The pasture and grazing condition declined as dry Hagaa winds reduced soil moisture and rapidly parched up vegetation. Water availability has decreased with 70-80% of berkads in Dharoor and Sool rendered empty. Dharjaale, Kalabayr, Hubabeys, Diriqle and Dhudhub were the worst hit villages leading to water trucking, by private tankers, from permanent water sources. The price of water therefore increased dramatically. However mobile herds from these villages moved to near and around boreholes and spring wells where livestock feed is sparse in both quantity and quality. However, during September, most parts of Bari have experienced Deyr rains.

1.2 Health context

Aktion Afrika Hilfe (AAH) runs, since October 1997, PHC projects in the 3 districts of Bari region, Gardo, Iskushuban and Bender-Beila. Previously, AICF (USA) supported PHC

services in the area but withdrew due to lack of financial support. With no implementing INGOs, MOSA is responsible for the running of Allula, Kandala and Bargal.

The Allula MCH ceased functioning in 1998 when the cold chain equipment – generator, refrigerator and freezer – was looted and taken to Habo. UNICEF then pegged further assistance on return of these items. During this period, Allula MCH and 5 surrounding health posts remained closed. However, with the intervention of community elders, the looted cold chain equipment were returned during the survey period. Consequently UNICEF sent a cold chain technician to assess and service the cold chain equipment (and reported that the generator and refrigerator are serviceable while freezer need to be replaced). As at the end of September, two Health Posts – Habo and Barreda – had been re-opened and provided with UNICEF Health Post (HP) kits.

Bargal MCH receives regular MCH kits under the UNICEF/MOSA PCA agreement. The 3 Health Posts in Kandala (Hamure, Balidhidhin and Dhadar) have been revitalised and are, since July 2002, receiving UNICEF HP kits. However, the subject of health facility opening hours and staff motivation especially those under MOSA management leave a lot to be desired. In addition, UNICEF supports outreach activities in Allula, Bargal and Kandala Districts. Two rounds have so far been done in Kandala, the second rounds for Allula and Bargal are scheduled for second week of October.

1.3 Water and Sanitation context

Since 1996 to date, UNICEF has been involved in rehabilitation, establishment and support of the water systems across the NEZ. A breakdown of activities undertaken in the 4 district of Kandala, Allula, Bargal and Iskushuban is given below:

Kandala

- Kandala town: shallow well rehabilitated and construction of 2 water storage tanks
- Dhadar – 10 shallow rural wells rehabilitated

Allula

- Allula town: shallow well rehabilitated, replaced the then existing water pipeline with rustproof pipeline and provided water pumping equipment and power
- Barreda: shallow well rehabilitated, constructed 2 water storage tanks and 3 public kiosks, laid down a 6-Km water pipeline and provided water pumping and power equipment
- Habo: bore well rehabilitated, constructed a water storage tank and 5 public kiosks, laid down a 6-Km water pipeline and provided water pumping and power equipment
- Gesaley: shallow well rehabilitated, constructed 3 water storage tanks and 5 public kiosks, laid down a 7-Km water pipeline and provided water pumping and power equipment
- Muranyo: shallow well rehabilitated, constructed 3 water storage tanks and 5 public kiosks, laid down a 7-Km water pipeline and provided water pumping and power equipment
- Garza: a water storage tank and public kiosk constructed and laid down a 2-Km water pipeline
- Dhurbo: shallow well rehabilitated, constructed a water storage tank and 2 public kiosks, laid down a 6-Km water pipeline and installed a solar generated water pump

Bargal

- Bargal town: bore well rehabilitated, constructed a water storage tank and 2 public kiosks, laid down a 1-Km water pipeline and provided new water pump.
- Taageer: the existing bore well is beyond repair and residents depend on berkads that are rain fed for drinking water. Otherwise, drinking water is trucked in from Bargal 57 Km away

Iskushuban

- Iskushuban town: the water source (spring) rehabilitated, constructed a water storage tank and 3 public kiosks, rehabilitated existing 3-Km water pipeline and provided water pumping and power equipment
- Hurdiye: the shallow well water is salty and therefore used only for bathing and other domestic purposes. Drinking water is fetched 15 Km away. UNICEF plans to rehabilitate existing water source in 2003.

Besides water rehabilitation and related activities, UNICEF has provided school sanitation facilities in Allula (Allula town, Barreda, Habo, Gesalaey and Muranyo), Kandala and Iskushuban where the hospital benefited too.

2. Survey objectives

- To assess the nutritional status of the Kandala, Allula, Bargal & Iskushuban under five children population using weight for height measurements
- To determine potential risk factors associated with malnutrition
- To determine household characteristics of study population
- To determine measles immunization, NIDs and vitamin A supplementation coverage of study population

3. Survey methodology

3.1 Study population and survey design

A cross-sectional survey targeting 32 existing villages in the 4 districts of Kandala, Allula, Bargal and Iskushuban was carried out. A two-stage cluster sampling methodology was used to randomly select 30 clusters from the 32 villages and their corresponding households as illustrated in the table below. Questionnaires (see annex 3) were administered to 598 household heads and nutrition status systematically assessed for 951 eligible 6-59 months old children in each household/family grouping.

District	No. of clusters	No. Households	No. of children 6-59 months old
Allula	8	171	255
Kandala	7	155	251
Iskushuban	11	181	306
Bargal	4	91	139
Total	30	598	951

Mothers and caretakers were interviewed as to whether their eligible children had suffered from diarrhoea, ARI and malaria in the 2 weeks prior to the survey; contracted measles in past one month; received vitamin A supplementation in past 6 months; and measles and polio immunisation status. Those with children less than 23 months were interviewed on their feeding practices.

3.2 Methods

The 32 villages of the 4 districts were listed with their corresponding population estimates. Thirty clusters were randomly selected: cluster interval calculated using estimated population; a random number, within cluster interval range, chosen to determine first cluster; and subsequent clusters determined by adding value of cluster interval to the randomly chosen number and to successive arising cumulative figures (see Annex 1).

During second stage sampling in respective clusters, the teams guided by team leaders and supervisors identified the centre and spun a pencil to determine the direction to take. Households in determined direction were identified, given numbers (written on a piece of paper), and the first household randomly picked. From first household with child aged 6-59 months, same direction was followed to successive households, always turning to the right hand direction on reaching end of cluster, until details of at least 30 children were gathered. Where caretaker or child was absent an appointment was made for a later visit by the team.

The assessment of nutritional status was based on simple anthropometric data and limited only to eligible children. Weight-for-height was the indicator of choice. Diarrhoea was defined as watery stool passed at least three times a day; ARI defined as a child having fever and cough; whilst measles defined as a child with fever and rash and cough, running nose or red eyes.

3.3 Measuring technique and recording

Weight

For weighting purposes, 25-kg salter hanging spring scales were used. The scale was adjusted to zero with the weighting pants attached to the hook, child freed of heavy clothing, the weighting pants put on and child suspended from the weighting scales by the handles of the pants. Weight was read to the nearest 0.1 kg with scale at eye level.

Height

Children up to 2 years (23 months or 85 cm) of age were measured on a horizontal measuring board and the length read to the nearest 0.1 cm. Those over 2 years of age (or over 85 cm) were measured standing on a horizontal surface against a vertical measuring device and height read to the nearest 0.1 cm.

Age

An attempt at determination of age was based on recall using a local traditional calendar/events (see annex 2) and estimates recorded in months. However, with the choice of nutrition indicator being weight-for-height, approximate age was useful in cross tabulation analysis.

Oedema

Was diagnosed by moderate thumb pressure applied to the back of feet or ankles for about 3 seconds. This was recorded only for children who had such thumb impression signs remaining for some time on both feet.

3.4 Training and supervision

A 3-day training session for six teams – each composed of 2 enumerators and 1 team leader – was conducted prior to the survey on 22–24 August. Plenary session included defining the role and tasks of each member of a survey team, selection of the first and subsequent households in pre-identified clusters as in the sampling frame, interviewing techniques, completion and coding of the survey form, and carrying out anthropometric measurements.

Demonstration of and practice in using questionnaires and measuring heights and weights of children was done followed by a field practical session (in one section of Bossaso town). Here, team members organised survey activities, carried out survey procedures and field-tested the questionnaires. The teams later reconvened, after fieldwork, for feedback and standardisation of procedures.

4. Data processing and analysis

EpiInfo 6 software was used for data processing and analysis. Data for household and child(ren) were entered in two separate files with household numbers as the unique identifier. A questionnaire (.qes) file, with dummy variables, was first created followed by data file (created out of the .qes file) and a CHECK file for interactive checking. The CHECKs set up included must-enter, legal values, range, conditional jumps and programme check.

Depending on the length of the digits anticipated, missing variable, where applicable, were coded as 9/99/999 and excluded (recode 9/99/999=.) during analysis. With the clean data set,

the EPINUT programme was used to determine the W/H Z-scores. For ease of data analysis, an analysis programme (.pgm) was written that RELATEd household and child files to produce relevant tabulations and associations with nutrition indicators and cut off points as in the table below.

Table 2: Nutrition status indicators and cut off points

Nutritional status	W/H Z-Score	W/H % of MEDIAN
Severe acute malnutrition	< -3 or oedema	< 70% or oedema
Moderate acute malnutrition	Between -3 and < -2	Between 70% and < 80%
Global acute malnutrition	< -2 or oedema	< 80% or oedema

5. Findings and interpretation of results

5.1 Description of the study population

Of the 598 households interviewed, 86.5% are male-headed; the median household size is 5 (interquartile range 4-7). Almost all (99%) of the study population are residents. Table 1 gives details of the household characteristics.

Table 3: Household characteristics

	n	*(%)*
Sex – Household head (n=598):		
Male	517	(86.5)
Female	81	(13.5)
Household size:		5 (4-7)
Household residence status:		
Resident	593	(99.2)
Internally displaced	5	(0.8)
Place of origin (n=5):		
SCZ	5	(100)
Date of arrival (n=5):		
1999	3	(60)
Before 1998	2	(40)
Reason for movement (n=5):		
Insecurity	3	(60)
Lack of jobs	2	(40)

5.2 Food, income sources and coping strategies

The population of the 4 districts appears to rely entirely on purchases (95%) for their food source. Income is derived from frankincense collection/sale (32%) mostly in Allula, casual work (30%) and small businesses (23%). Coping mechanisms revolve around borrowing (88%), purchases (3%) and livestock sale (3%).

Table 4: Food, income and coping strategy

	n	*(%)*
Main food source (n=598):		
Own animal products	10	(1.7)
Household crop production	3	(0.5)
Purchases	569	(95.2)
Remittances/gifts	2	(0.3)
Begging	1	(0.2)
Religious support group	13	(2.2)
Main source of income (n=596):		
Small business	138	(23.2)
Causal work	172	(28.9)
Salaried employment	13	(2.2)
Sale of crops	6	(1)
Sale of animals	18	(3)
Remittances/gifts	22	(3.7)
Frankincense collection/sale	192	(32)
Lobster sale	17	(2.9)
Imam & Quran teachers	5	(1)
Religious group	13	(2.2)
Coping strategy (n=598):		
Remittances/gifts	5	(0.8)
Livestock sale	14	(2.3)
Business – charcoal, lobster etc	5	(0.8)
Begging	2	(0.3)
Borrowing	526	(88)
Food aid	3	(0.5)
Purchases	18	(3)

5.3 Water and Environmental sanitation

The Kandala, Allula, Bargal & Iskushuban residents draw their drinking water from berkads (59%), taps/piped water (19%) and open wells (14%). Analysed data suggest that berkads are exclusive source of drinking used in Kandala. More than 60% of the population relieve themselves in the bush/open ground whilst 70% of pit latrines in use were observed to be generally clean.

Table 5: Water and sanitation

	n	*(%)*
Main source of drinking water (n=598):		
Open wells	85	(14.2)
Protected wells	5	(0.8)
Berkads	354	(59.2)
Stream river	43	(7.2)
Tap/piped water	111	(18.6)
Sanitation facility (n=598):		
Pit latrine	224	(37.5)
Flush toilets	3	(0.5)
Bush/open grounds	371	(62)
Observe (n=224):		
Used and clean	158	(70.5)
Unused	14	(6.3)
Used and dirty	52	(23.2)

5.4 Analysis of nutrition data

5.4.1 Distribution

Table 6: Distribution according to age and sex

	Boys		Girls		Total	
	n	(%)	n	(%)	n	(%)
6-11 months	55	(47)	62	(53)	117	(12.3)
12-23 months	105	(49.8)	106	(50.2)	211	(22.2)
24-35 months	125	(57.9)	91	(42.1)	216	(22.7)
36-47 months	93	(54.4)	78	(45.6)	171	(18)
48-59 months	129	(54.7)	107	(45.3)	236	(24.8)
Total	507	(53.3)	444	(46.7)	951	(100)

	Boys		Girls		Total	
	n	(%)	n	(%)	n	(%)
6-23 months	160	(48.8)	168	(51.2)	328	(34.5)
24-59 months	347	(55.7)	276	(44.3)	623	(65.5)
Total	507	(53.3)	444	(46.7)	951	(100)

Table 7: Distribution according to sex and nutritional status (weight/height index in Z score or oedema)

	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal >= -2		Oedema	
	n	(%)	n	(%)	n	(%)	n	(%)
Male	12	(2.4)	60	(11.8)	435	(85.8)	3	(0.6)
Female	8	(1.8)	40	(9)	396	(89.2)	3	(0.7)
Total	20	(2.1)	100	(10.5)	831	(87.4)	6	(0.6)

	GaM < -2 + oedema		Normal >= -2		Total	
	n	(%)	n	(%)	n	(%)
Male	72	(14.2)	435	(85.8)	507	(53.3)
Female	48	(10.8)	396	(89.2)	444	(46.7)
Total	120	(12.6)	831	(87.4)	951	(100)

Analysis suggests no association between sex and global acute malnutrition (p=0.141)

Table 8: Distribution according to age and nutritional status (weight/height index in Z score or oedema)

	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal >= -2		Oedema	
	n	(%)	n	(%)	n	(%)	n	(%)
6-11 months	2	(1.7)	1	(0.9)	114	(97.4)	2	(1.7)
12-23 months	7	(3.3)	24	(11.4)	180	(85.3)	3	(1.4)
24-35 months	3	(1.4)	24	(11.1)	189	(87.5)	1	(0.5)
36-47 months	5	(2.9)	16	(9.4)	150	(87.7)	0	0
48-59 months	3	(1.3)	35	(14.8)	198	(83.9)	0	0
Total	20	(2.1)	100	(10.5)	831	(87.4)	6	(0.6)

	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal >= -2		Oedema	
	n	(%)	n	(%)	n	(%)	n	(%)
6-23 months	9	(2.7)	25	(7.6)	294	(89.6)	5	(1.5)
24-59 months	11	(1.8)	75	(12)	537	(86.2)	1	(0.2)
Total	20	(2.1)	100	(10.5)	831	(87.4)	6	(0.6)

	GaM < -2 + oedema		Normal >= -2		Total	
	n	(%)	n	(%)	n	(%)
6-11 months	3	(2.6)	114	(97.4)	117	(12.3)
12-23 months	31	(14.7)	180	(85.3)	211	(22.2)
24-35 months	27	(12.5)	189	(87.5)	216	(22.7)
36-47 months	21	(12.3)	150	(87.7)	171	(18)
48-59 months	38	(16.1)	198	(83.9)	236	(24.8)
Total	120	(12.6)	831	(87.4)	951	(100)

	GaM < -2 + oedema		Normal >= -2		Total	
	n	(%)	n	(%)	n	(%)
6-23 months	34	(10.4)	294	(89.6)	328	(34.5)
24-59 months	86	(13.8)	537	(86.2)	623	(65.5)
Total	120	(12.6)	831	(87.4)	951	(100)

There exits an association between age group and global acute malnutrition (p=0.157)

Table 9: Distribution according to district and nutritional status (weight/height index in Z score or oedema)

District	GaM < -2 + oedema		Normal >= -2		Total	
	n	(%)	n	(%)	n	(%)
Allula	47	(18.4)	208	(81.6)	225	(26.8)
Kandala	37	(14.7)	214	(85.3)	251	(26.4)
Iskushuban	26	(8.5)	280	(91.5)	306	(32.2)
Bargal	10	(7.2)	129	(92.8)	139	(14.6)
Total	120	(12.6)	831	(87.4)	951	(100)

There exists an association between district and global acute malnutrition (p=0.001)

District	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal >= -2		Oedema	
	n	(%)	n	(%)	n	(%)	n	(%)
Allula	6	(2.4)	41	(16.1)	208	(81.6)	0	0
Kandala	7	(2.8)	30	(12)	214	(85.3)	4	(1.6)
Iskushuban	4	(1.3)	22	(7.2)	280	(91.5)	2	(0.7)
Bargal	3	(2.2)	7	(5)	129	(92.8)	0	0
Total	20	(2.1)	100	(10.5)	831	(87.4)	6	(0.6)

5.4.2 Indicators

Table 10: Indicators – proportions and confidence interval

	Proportion (%)	95% Confidence Interval (%)
Oedema	6 (0.6)	
Global acute malnutrition	120 (12.6)	(10.6 – 14.9%)
Severe acute malnutrition	20 (2.1)	(1.3 – 3.3%)

5.4.3 Interpretive analysis

Table 11: Distribution according to age and nutritional status – proportions and confidence interval

	Global acute malnutrition	
	Proportion (%)	95% Confidence Interval (%)
6-23 months	34 (10.4)	(7.4 – 14.3%)
24-59 months	86 (13.8)	(11.2 – 16.8%)

	Severe acute malnutrition	
	Proportion (%)	95% Confidence Interval (%)
6-23 months	9 (2.7)	(1.3 – 5.3%)
24-59 months	11 (1.8)	(0.9 – 3.2%)

5.5 Health and morbidity

Over three quarter (77%) of families seek medical assistance for their sick child(ren) at private clinic/pharmacy (86%) and public health facility (11%). Whilst lack of money (22%) and lack of health facilities and workers alike (12%) are given as reasons for not seeking medical attention, Quran recitation (66%), however, is cited as an important alternative to seeking medical attention.

Table 12: Health seeking behaviour

	n	*(%)*
Seek assistance when child sick (n=598):		
Yes	458	(76.6)
No (n=139):	140	(23.4)
Lack of money	31	(22.3)
Reciting Koran	92	(66.2)
No HW, HC/P	16	(11.5)
Where (n=458):		
Traditional healer	15	(3.3)
Private clinic/pharmacy	392	(85.6)
Public health facility	182	(11.1)

Analysis of morbidity data per district suggests existence of significant association between district and morbidity history (Chi-square test of association p=0.000) with a significant increasing trend (Chi-square for linear trend: p=0.000) in proportion of morbidity for children in Bargal, Iskushuban, Kandala and Allula districts respectively.

Table 13: Morbidity history segregated by district

District	Diarrhoea (%)	ARI (%)	Malaria (%)	Measles (%)
Allula	96 (37.6)	148 (58)	150 (58.8)	3 (1.2)
Kandala	65 (25.9)	132 (52.6)	72 (28.7)	11 (4.4)
Iskushuban	63 (20.6)	136 (44.4)	63 (20.6)	43 (14.1)
Bargal	28 (20.1)	49 (35.3)	21 (15.1)	11 (7.9)
Total	252 (26.5)	465 (48.9)	306 (32.2)	68 (7.2)

5.6 Measles immunisation and vitamin A supplementation

Among the 12-23 months old children, 28% had received measles immunisation based on card verification only and 64% by card or history anytime before the survey. Of the infants eligible for measles immunisation, two fifth had not yet received their jabs as at the time of the survey.

Table 14: Measles coverage and vitamin A supplementation

	No (%) received immunisation 9- 11 months (n=71)	*No (%) received immunisation 12-23 months (n=209)*	*No (%) received immunisation 9-59 months (n=900)*
Yes – with card	19 (27.1)	58 (27.8)	160 (17.8)
Yes – with history/without card	23 (32.9)	75 (35.9)	440 (48.9)
No	28 (40)	76 (36.4)	300 (33.3)

Survey results suggest that during the 15-17 April 2002 2nd round Spring NIDs:

- 82% of the 6-59 months children population received the polio dose (the preliminary 2nd round polio NIDs results gave a 88% coverage for Bari region)
- No association exist between sex and last polio dosage (p=0.067); both boys and girls had equal opportunity of being immunised against polio
- Of the children who missed the April 2nd round NIDs, half said that the child was not at home, 36% reported that the polio team did not visit at all whilst 4% thought the vaccine was unsafe/unimportant.

Table 15: OPV and vitamin A supplementation coverage

	n	*(%)*
No of times OPV received in 2001 (n=950):		
Once	127	(13.4)
2 times	362	(38.1)
3 times	376	(39.6)
None	85	(8.9)
OPV received in April 2002, 2nd round Spring NIDs (n=950):	780	(82.1)
Reason for missing OPV (n=132):		
Team did not come	61	(35.9)
Child not at home	85	(50)
Child sleeping	14	(8.2)
Child sick	4	(2.4)
Vaccine unsafe	5	(2.9)
OPV unimportant	1	(0.6)
Vitamin A supplementation coverage (n=951):	732	(77)

Survey results suggest 77% vitamin A supplementation coverage during the preceding 6 months to the survey.

5.7 Feeding practices

About half (48%) of the 6-23 months old children had stopped breastfeeding as at the time of the survey and with majority (92%) reporting having introduced complementary feeds during the first 6-month period of recommended exclusive breastfeeding. Of those who had stopped breastfeeding, 43% had done so during the first six months of life. However, majority (95%) of the children are fed 3-4 or more times in a day.

Table 16: Feeding practice

	n	*(%)*
Are you breastfeeding child (n=325):		
Yes	153	(47.1)
No	156	(48)
Never	16	(4.9)
Age when child stopped breastfeeding (n=156):		
0-6 months	67	(42.9)
7-11 months	39	(25)
12 months or more	50	(32.1)
Weaning age (n=309):		
0-6 months	284	(91.9)
7 months or more	25	(8.1)
Feeding frequency (n=324):		
Once	3	(0.9)
2 times	13	(4)
3 times	125	(38.6)
4 or mores times	183	(56.5)

5.8 Analysis of potential risk factors

Analysis of potential risk factors (see Table 16) indicate existence of significant statistical association with global acute malnutrition for diarrhoea and malaria:

- Children with history of diarrhoea in the past 2 weeks prior to the survey were at a 2.35-fold increase in risk of being acutely malnourished whilst
- Those who gave a history of having had malaria 2 weeks prior to the survey were at a 1.7-fold increase in risk of being acutely malnourished

There exists too a significant association (Chi-square test of association: p=0.001) between district and global malnutrition with a demonstrable statistical significant increasing trend (Chi-square for linear trend: p=0.000) in proportion of acute malnutrition for children from Bargal (7.2%), Iskushuban (8.5%), Kandala (14.7%) and Allula (18.4%) districts respectively.

Table 17: Description of risk factors and results of univariate analysis with respect to prevalence of global acute malnutrition

Exposure variable	*n*	*(%)*	*Crude RR*	*95% CI*	*p-value*
Household head sex:					
Male	106	(12.8)	1.16	0.68-1.95	0.687
Female	14	(11.1)			
Sanitary facility:					
Pit latrine/flush toilet	42	(11.3)	0.84	0.59-1.20	0.388
Bush/open ground	78	(13.4)			
Child sex:					
Male	72	(14.2)	1.31	0.93-1.85	0.141
Female	48	(10.8)			
Age group:					
6-23	34	(10.4)	0.75	0.52-1.09	0.157
24-59	86	(13.8)			
Diarrhoea:					
Yes	55	(21.8)	2.35	1.69-3.26	0.000
No	65	(9.3)			
ARI:					
Yes	66	(14.2)	1.28	0.91-1.79	0.182
No	54	(11.1)			
Malaria:					
Yes	54	(17.6)	1.72	1.24-2.41	0.002
No	66	(10.2)			
Measles:					
Yes	6	(8.8)	0.68	0.31-1.50	0.43
No	114	(12.9)			
Vitamin A:					
Yes	94	(12.8)	1.08	0.72-1.63	0.792
No	26	(11.9)			
Weaning age:					
0-6 months	29	(10.2)	0.85	0.28-2.60	0.951
7 months or more	3	(12)			

There exists no evidence of statistical association with global acute malnutrition for household head sex, sanitary facility, child sex, age group, ARI, measles, vitamin A supplementation and weaning age.

Similarly, chi-square test of association shows no significant association with acute global malnutrition for stratified age group (p=0.288), age at which breastfeeding was stopped (0.891) and feeding frequency (p=0.328).

Further analysis show no significant difference between means of household size of acutely malnourished and that of normal children (t-test: p=0.282).

6. Conclusion and Recommendations

Severe and global acute malnutrition rates of 2.1% and 12.6% weight-for-height (W/H) Z-Scores respectively may be acceptable. However, the demonstrable statistical significant increasing trend (Chi-square for linear trend: p=0.000) in proportion of acute malnutrition for children from Bargal (7.2%), Iskushuban (8.5%), Kandala (14.7%) and Allula (18.4%) districts respectively raises concern for the districts of Allula and Kandala. Similar increasing trends is also observed for morbidity histories.

With the revitalisation– return of looted cold chain and issuance of health and EPI supplies – of health services in Allula and Kandala, it is hoped that morbidity, arising especially from diarrhoea and malaria significantly associated with acute malnutrition in this survey, are taken care of. Possibility of introducing impregnated mosquito nets will be explored and nutrition surveillance and growth monitoring introduced in the Allula MCH.

As is the case with other regions in Somalia, there is need to intensify health and nutrition education activities at household level targeting mothers, fathers and other caregivers to address care concerns especially for the young children (6-23 months old). The main areas of focus should include promotion of exclusive breastfeeding, appropriate young child feeding, diet diversification, and improvement in household hygiene and health care practices.

Annexes

Annex 1: Cluster sampling/identification

Location	*Total Pop.*	*Target Pop*	*Cum. Pop*	*Attributed No.*	*Clusters*
Iskushuban district					
Iskushuban town	2,000	400	400	265	1
B.Madoobe	1,000	200	600	0	0
Foocaar	1,000	200	800	628	1
Iskorsaar	1,000	200	1,000	991	1
Dharroor	1,300	260	1,260	0	0
Hurdiye	1,300	260	1,520	1,354	1
Timirshe	1,500	300	1,820	1,717	1
Xaafuun	1,000	200	2,020	0	0
Duud Hooyo	2,000	400	2,420	2,080	1
Xiriiro	3,500	700	3,120	2,443; 2,806	2
Rako	4,000	800	3,920	3,169; 3,532; 3,898	3
Bargal district					
Bargal town	3,000	600	4,520	4,258	1
Muudiye	2,000	400	4,920	4,621	1
Taageer	1,500	300	5,220	4,984	1
Waashiton	1,000	200	5,420	5,347	1
Allula district					
Allula town	1,000	200	5,620	0	0
Dhuxun 1	1,000	200	5,820	5,710	1
Dibir	1,000	200	6,020	0	0
CeelQuud	1,500	300	6,320	6,073	1
Ximistiyo	1,200	240	6,560	6,436	1
Bareeda	1,000	200	6,760	0	0
Geesaley	1,800	360	7,120	6,799	1
Murcanyo	1,800	360	7,480	7,162	1
Hursale	2,000	400	7,880	7,525	1
Sayn-weyn	2,000	400	8,280	7,888; 8,251	2
Kandala district					
Qandala town	1,000	200	8,480	0	0
Beeliwacatay	1,000	200	8,680	8,614	1
Sheebaab	1,500	300	8,980	8,977	1
Unuun	2,000	400	9,380	9,340	1
Dhaadaar	2,000	400	9,780	9,703	1
Dhasan	2,500	500	10,280	10,066	1
Balidhidin	3,000	600	10,880	10429; 10,792	2
Total	*54,400*	*10,880*			*30*

Sampling interval: 363

Random selection: 265

Annex 2: Puntland traditional calendar

Months	Annual Events	1997	1998	1999	2000	2001	2002
JAN	Mid of Jiilaal		56	44	Soon 32	Soon fur 20	Sidatal 8
FEB	End of Jiilaal		55	43	Soon fur 31	Sidataal 19	Arafo Iid Al-Ad Haa 7
MAR	Start of Gu Season		54	42	Sidataal 30	Arafo Iid Al-Ad Haa 18	Sako 6
APR	Middle Gu Season		53	41	Arafo Iid Al-Ad-haa 29	Sako 17	Safar 5
MAY	End of Gu Season		52	40	Meeting in Arte Shirka Carta Safar 28	Safar 16	Mowliid 4
JUNE	Start of Haga Season		51	39	Mowliid 27	End of Formal Administration in Puntland Mowliid 15	Malmadoone Bilo-Samo I 3
JULY	Middle of Haga Season		50	38	Siyaaro 26	Siyaaro 14	Bilo-Samo II 2
AUG	End of Haga Season		Establishment of Puntland State 49	37	Jamaadul Awal 25	Fighting in Bossaso Jamaadul Awal 13	Jamaadul Akhir 1
SEPT	Start of Deyr Season		48	36	Jamadul Akhir 24	Jamaadul Akhir 12	
OCT	Middle of Deyr Season	Flood in CSZ Daadadkii Koonfur 59	47	35	Sabuux (Rajab) 23	Sabuux (Rajab) 11	
NOV	End of Deyr	Flood in CSZ Daadkii Koonfur 58	46	34	Soon Dheere (Shacbaan) 22	Fighting in Garowe Soon Dheere (Shacbaan) 10	
DEC	Start of Jiilaal	57	45	33	Soon (Ramadan) 21	Soon (Ramadan) 9	

Annex 3: Survey questionnaire

Household No.	Date	Team Number	Cluster Number	Name of supervisor	Section	Subsection

Name of household head	Q1 Sex 1= M 2 = F	Q2 Household size	Q3 No. of u5s

Q4 Household residence status	Q5 Place of origin (Country/region)	Q6 Date of arrival (year)	Q7 Reason for movement
1 = Resident: Go to No. 8 2 = Resident returnee 3 = Internally displaced 4 = Refugee 5 = Other – specify	1: Ethiopia 2: Kenya 3: South and Central zone 4: Mudug 5: Nugal 6: Bari 7: Somaliland 8: Other	1: 2002 2: 2001 3: 2000 4: 1999 5: 1998 6: Before 1998	1 = Insecurity 2 = Lack of jobs 3 = Food shortage 4 = Water shortage 5 = Other – specify

Q8 Household's main food source?	Q9 Household's main income source	Q10 How does this household survive during food shortages (coping strategies)?	Q11 Main source of drinking water	Q12 Sanitation Facility	Q13 When your child is sick, do you seek medical assistance?
1 = Animal products from own production 2 = Household crop production 3 = Purchases 4 = Remittances/Gifts 5 = Begging 6 = Wild foods collection 7 = Others – specify	1 = Small business 2 = Casual work 3 = Salaried employment 4 = Sale of crops 5 = Sales of animals and animal products 6 = Remittances/Gifts 7 = Others – specify	1= Remittances/Gifts 2= Sale of more livestock 3= Splitting of the family 4= Begging 5= Borrowing 6= Food aid 7= Purchases 8= Wild food collection 9= Others – specify	1 = Borehole 2 = Open wells 3 = Protected wells 4 = Berkads 5 = Catchments/pond 6 = Stream/river 7 = Muscid 8 = Tap/piped water 9 = Tanker/truck vendor 10 = Others – specify	1 = Pit latrines: Go to Q12b 2 = Flash toilets 3 = Bush/Open ground Q12b Condition of the facility (Observe) 1 = Used and clean 2 = Unused 3 = Used and dirty 4 = Others – specify	1 = Yes: Go to Q13b 2 = No: Go to Q13c Q13b Where? 1 = Traditional healer 2 = Private clinic/pharmacy 3 = Public health facility 4 = Others – specify _____ Q13c Why? – specify

Serial No	Name	Q14 Sex 1 = M 2 = F	Q15 Age (Months)	Q16 Oedema 1 = Yes 2 = No	Q17 Height (Cm)	Q18 Weight (Kg)

For Q28-31, ask mothers with child(ren) 6-23 months old

Serial No.	Q19 Diarrhoea in last 2 weeks?	Q20 ARI in last 2 weeks?	Q21 Malaria in last 2 weeks?	Q22 Measles in last 1 month?	Q23 Vaccinated against measles?	Q24 Vitamin A provided in the last 6 months?	Q25 Number of times OPV received during 2001 NIDs?	Q26 OPV received in last NIDs round?	Q27 Reason for missing OPV dose(s)?	Q28 Are you B/F child?	Q29 If no, how old was child when you stopped B/F?	Q30 At what age was child given foods other than breast milk?	Q31 How many times in a day do you feed child?
	1 = Yes 2 = No	1 = Yes 2 = No	1 = Yes 2 = No	1 = Yes 2 = No	1 = past 6m (card) 2 = past 6m (recall) 3 = before 6m (card) 4 = before 6m (recall) 5 = None	1 = Yes 2 = No	1 = Once 2 = 2 times 3 = 3 times 4 = None	1 = Yes: Go to Q28 2 = No	1 = team didn't come 2 = child not at home Care taker refused because: 3 = child sleeping 4 = child sick 5 = vaccine unsafe 6 = OPV not important 7 = Other –specify	1 = Yes 2 = No 3 = Never: Go to Q31	1 = 0-6m 2 = 7-11m 3 = 12m or more	1 = 0-6m 2 = 7m or more	1 = Once 2 = 2 times 3 = 3 times 4 = 4 or more