ANAEMIA, INFANT FEEDING AND ANTHROPOMETRIC SURVEY

Ali Adde Refugee Camp

Djibouti

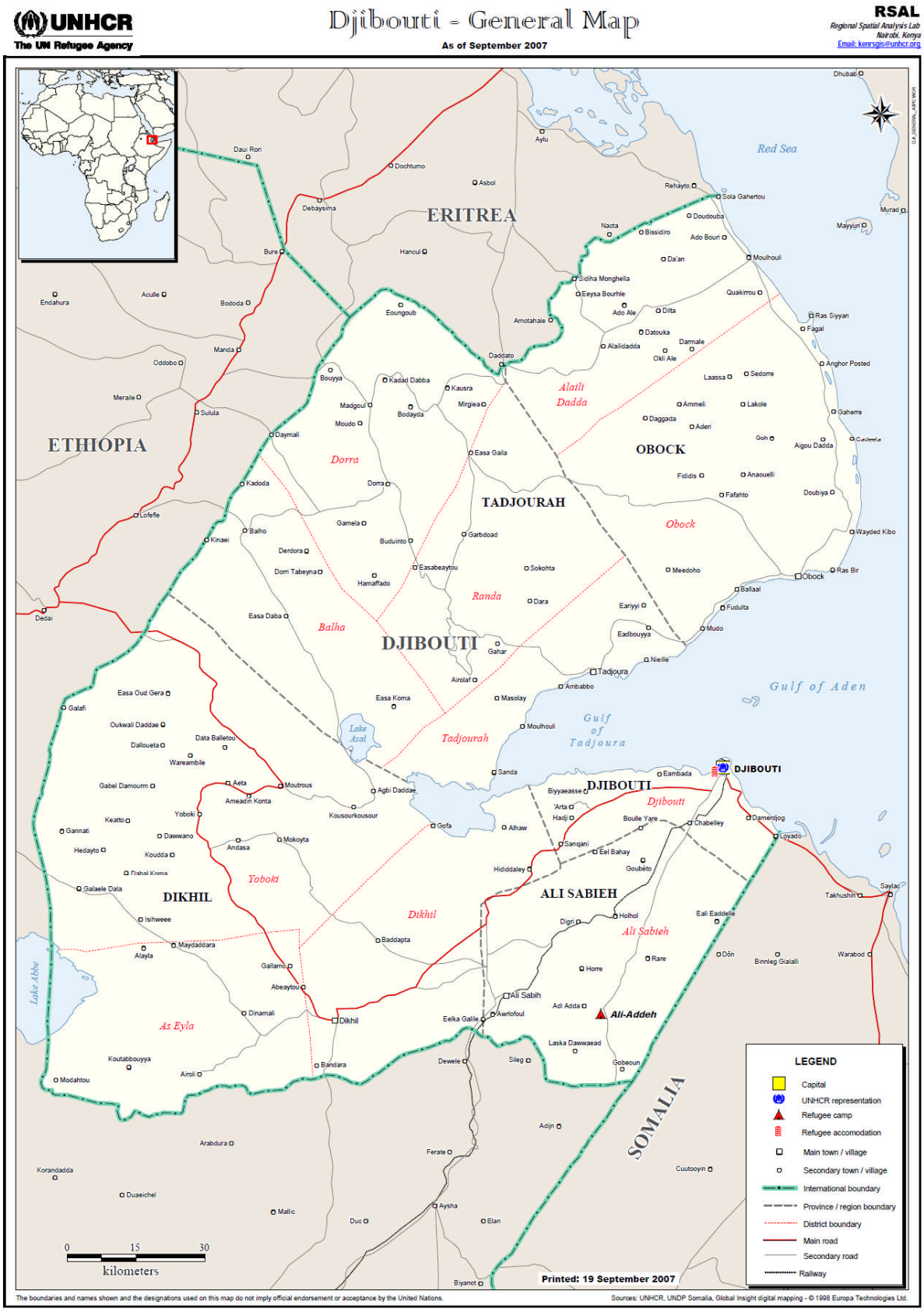
March –April 2010

UNHCR

IN COLLABORATION WITH

AMDA

UCL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Refugee camp
Refugee accomodation
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International boundary
Province / region boundary
District boundary
Main road
Secondary road
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Executive Summary

A nutrition survey was performed in Ali Adde refugee camp from 26th March -2nd April 2010. The aim of the survey was to assess the prevalence of malnutrition in children and to determine the prevalence of anaemia among children 6-59 months, and women of child bearing age (15-49 yrs). The survey also assessed infant and young child feeding practices, household food security, and retrospective mortality and morbidity. The survey was funded and initiated by UNHCR and carried out in collaboration with AMDA. The survey was performed by a consultant recruited through the UCL Centre for International Child Health and Development.

The survey design was a cross-sectional, two stage cluster survey. Thirty clusters of 16 households were sampled. Three population groups: children (6-59 months); infants (0-5 months), and women (15-49 yrs) were included in the survey. Anthropometric measurements were taken on children 6-59 months and infant feeding practice was measured using a 24-hour recall questionnaire. Peripheral blood haemoglobin was measured in children, and women. Food security was assessed using a household dietary diversity score and general ration distribution records were analysed for nutritional content. Crude mortality and under five mortality data, together with child morbidity assessment, was also obtained during the survey.

Anthropometric data was analysed using both the NCHS/WHO 1977 Reference as well as the WHO 2006 International Growth Standards. Global acute malnutrition (wasting and/or oedema) was found in 16.5 % (95% CI, 13.0 - 20.7) and 16.9 % (95% CI,.12.9 - 21.9) of 6-59 months old children when assessed using weight for height z-scores (WHZ <-2) based on the NCHS 1977 Reference and WHO Standards 2006 respectively, and 12.2 % (95% CI, 9.0 - 16.7) when using weight for height % of the median (WHM <80%) based on NCHS 1977 Reference. One case of nutritional oedema was detected. Severe acute malnutrition was found in 3.1 % (95% CI, 1.8 - 5.4) and 6.1 % (95% CI, 4.0 - 9.2.) of children aged 6-59 months when using NCHS 1977 Reference and WHO 2006 Standards respectively, while a prevalence of acute severe malnutrition of 2.4 % (95% CI, 1.3 - 4.4) was found when using the WHM based on NCHS 1977 Reference.

Chronic malnutrition in children aged 6-59 months (stunting, HAZ <-2) was relatively low with a prevalence of 33.8 % (95% CI, 28.2 - 39.9). The mean mid upper arm circumference (MUAC) in children 1-5 years was 14.7 cm (SD 1.3). When comparing the anthropometric results of the December 2008 nutrition survey to the present survey, there appears to have been a population wide deterioration in moderate acute malnutrition in children aged 6-59 months which can be attributed in part to the recent outbreak of diarrhoea.

Mortality rates over a recall period of 119 days were within acceptable limits with 0.25/ 10,000/day (95% CI, 0.11-0.60) and 0.26 /10,000/day (95% CI, 0.06-1.09) for the crude and under five mortality rates respectively. A decrease in under five mortality rate was found this year as compared to the 2008 survey which can be attributed in part to the substantial improvement of the general nutrition activities in the camp with increased staff capacity, infrastructure and adherence to guidelines.

Breastfeeding was widely practiced with 80.8% (95% CI, 75.3-85.3) of mothers initiating within one hour of birth. Prevalence of exclusive breastfeeding in infants < 6 months and those <4 months was low with a prevalence of 23.1% (95% CI, 15.1-33.6) and 28.9% (95% CI, 18.3-42.3) respectively. Timely introduction of complementary infant/weaning food was fairly high with 77.8% (95% CI, 63.7-87.5) of the children introduced to appropriate foods between the ages of 6 and 10 months. The prevalence of diarrhoea in infants/children, as reported by the mother, was 25.9% (95% CI, 20.9-31.5), with a pronounced peak at the age range 13-18 months. In agreement with international health recommendations, 73.5% (95% CI, 62.0-82.6) of mothers reported continuing to feed their children during episodes of diarrhoea. The diarrhoea cases from the outbreak date back to the last week of February 2010 with the peak in the second week of March 2010. As the survey was conducted in the fourth week of March 2010, diarrhea cases might not have been captured within the two weeks recall period used in the survey.

Vaccination coverage in children of 12-23 months was determined by vaccination card record. 92.1% (95% CI, 86.1-95.7) possessed a vaccination card and vaccination

coverage was 97.4% (95% CI, 92.7-99.1) for BCG, 97.4% (95% CI, 92.9-99.3) for DPT and 90.6% (95% CI, 84.0-94.7) for measles.

Anaemia (Hb<11.0 g/dl) was present in 42.4% (95% CI, 38.5-46.4) of children 6-59 months and severe anaemia (Hb <7.0 g/dl) in 1.5% (0.8-2.9) of the same target group. A significant difference was noted between children younger than 24 months (60.2%) as compared with those above 24 months (34.4%). In women of reproductive age (non-pregnant), anaemia prevalence (Hb<12.0 g/dl) was found to be 37.9% (CI?) and severe anaemia (Hb<8.0 g/dl) 1.5% (95% CI, 0.7-3.3). The mean level of haemoglobin was 11.0 g/dl (SD 1.4) in children 6-59 months and 12.3 g/dl (SD 1.5) in women of reproductive age (non-pregnant). There was a significant total anaemia reduction of 24.1% observed in children 6-59 months as compared to the last survey (66.6%). However the anaemia reduction of 6.6% observed in women was not statistically significant as compared to the last survey (44.5%). There are a number of factors that could have contributed to the anaemia reduction seen in children including improvements of the nutrition program, active case finding, better case detection and follow-up, provision of a lipid-based nutrient supplement (LNS), and the inclusion of pregnant and lactating women into the supplementary feeding program.

Data on the general food ration distribution in the last six months showed adequate attainment of the required kilocalories and essential vitamins including vitamins A and C, niacin and thiamine but low levels of iron, calcium and riboflavin. The mean number of meals eaten per day was found to be 2.68 with over 71.8% (95% CI 67.6-75.7) of the population consuming less than the required three meals per day. 84% of the population reported that the food ration given does not last for the intended 30 days. Respondents reported that the general ration lasted for an average of 20.1 days (SD 5.9). Reported coping strategies included borrowing from relatives and neighbours and 18.7% of respondents reported buying.

Due to the recent diarrhoea outbreak, immediate intervention strategies to improve the water and sanitation situation are required. With the current prevalence of GAM of

16.5%, there is a need to consider blanket supplementary feeding for all children under five years for a period of 3-6 months. There is need to explore the possibility of expanding the current distribution of LNS to children above 23 months of age in order to support all children under five and use the stock in time as it is about to expire. There is also a need to roll out the multi storey gardening to all the sections of the camp while ensuring roll-out to interested households already on the waiting list.

Despite the high prevalence of acute malnutrition in the camp which was thought to be largely attributable to the recent diarrhoeal outbreak, a significant reduction in the prevalence of anaemia and stunting was noted though the latter was significant. The increase in the prevalence of moderate acute malnutrition from last year's survey is thought to be attributed to the diarrhoea outbreak. It is in this view that a careful interpretation of this finding is required considering that improvements of the nutrition program were noted. Streamlining and improving health care delivery, antenatal care and infant growth monitoring programs will be important in improvement of heath related services. Further detailed recommendations for action based on the findings of this survey are provided following the discussion.

Table of Contents

Executive Summary iii
Acknowledgements ix
ACRONYMS AND ABBREVIATIONS x
1.0 Introduction 1
2.0 Background 2
2.1 Health and nutrition 3
2.2 JAM assessment finding 8
3.0 Survey Objectives 9
4.0 Survey Methodology 9
4.1 Staff training and team organization 9
4.2 Target Population Groups for the Survey 11
4.3 Sample Size Calculation 11
4.3.1 Anaemia 11
4.3.2 Global acute malnutrition (GAM, wasting) in children 6-59 months 12
4.3.3 Mortality rate 12
4.3.4 Infant feeding indicators in children 0 - <24 months 12
4.3.5 Sampling 12
5.0 Data Collection 14
5.1 Measurement of Haemoglobin 14
5.3 Anthropometric Measurements 15
5.4 Food intake status of the households 17
5.5 Information on Infant Feeding Practices 17
5.6 Morbidity and Mortality data 18
5.7 Collection of Questionnaire Data 18
5.8 Qualitative data collection 18
5.9 Data Management 19
5.10 Ethics and Informed Consent 19
5.11 Implementation Schedule 20
5.12 Logistics 20
6.0 Results 20
6.1 Anaemia 23
6.2 Anthropometry in 6-59 month children 26
6.3 Chronic Malnutrition (Stunting) 30
6.4 Malnutrition based on MUAC for the Refugee Camp 31
6.4 Trends in malnutrition in Ali Adde refugee camp 2006-2010 32
6.5 Infant and Young feeding practices 33
6.6 Prevalence of Diarrhoea and Feeding Response 37
6.7 Introduction of Different Foods by Age 39
6.8 Vaccination coverage from cards 12-23 months 42
6.9 Household food consumption and food sources 42
6.9.1 Meal patterns for refugees and host population 42
6.9.2 Duration the food ration lasts 43
6.11 Food Distribution Analysis 45
6.12 Retrospective mortality data 48
6.13 Factors associated with Malnutrition and Anaemia 48
7.0 DISCUSSION 55
8.0 RECOMMENDATIONS 59
8.0 RECOMMENDATIONS 59
9.0 Annex 63

Figures and Tables

Table 1 Trend of Malnutrition in children 6-59 months in the last three years 5
Table 2 Target population and procedure.....11
Table 3 Cut-off Points for Defining Anaemia[10] 14
Table 4 Classification of the public health significance of anaemia in populations on the basis of prevalence estimated from blood levels of haemoglobin 15
Table 5 Definitions of acute malnutrition using WFH and/or oedema in children aged 6–59 months 16
Table 6 Guidelines for Classification of Malnutrition based on MUAC.....17
Table 7 Characteristics of the population sample groups.....22
Table 8 Distribution of age and sex of 6-59 Months Children 23
Table 9 Haemoglobin level and prevalence of Anaemia.....24
Table 10 Prevalence of Acute Malnutrition in Children 27
Table 11 Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema 29
Table 12 Prevalence of Chronic Malnutrition in Z-scores (Stunting) in Children.....30
Table 13 Malnutrition rate based on MUAC 31
Table 14 Indicators of Morbidity and Infant and Young Child Feeding Practices 35
Table 15 Vaccination coverage in 12-23 months from cards 42
Table 16 Mean number of meals normally eaten and that eaten the day preceding the survey.....43
Table 17 Quantities and food items distributed in the camp. 46

Figure 1 Incidence of common illnesses among children, January- November 2009.....5
Figure 2 Admission to the SFP,TFC and Anaemia cases: January- November 2009 7
Figure 3 Age-Sex pyramid of the sample children population 23
Figure 4 Distribution of Haemoglobin Concentration in Children 6-59 Months.....25
Figure 5 Distribution of Haemoglobin Concentration in Non Pregnant Women 25
Figure 6 Haemoglobin level Classification by age set category.....26
Figure 7 Distribution of Weight for Height z-scores in 6-59 Months.....27
Figure 8 Prevalence of Malnutrition by age category based on weight-for-height z-scores 29
Figure 9 Distribution of Height for Age Z score (stunting).....30
Figure 10 Trends in Malnutrition in Ali Adde refugee camp 2006-2010.....32
Figure 11 Initiation of Breastfeeding after birth 36
Figure 12 Trends in Diarrhoea prevalence with age 38
Figure 13 Levels of feeding infants during diarrhoea 38
Figure 14 Milk Consumption in Infants and Young Children.....40
Figure 15 Consumption of Non-milk Fluids in Infants and Young Children.....41
Figure 16 Consumption of Solid and Mushy Complementary Infant Foods.....41
Figure 17 Frequency of duration the food ration lasts 43
Figure 18 Coping mechanism of households.....44
Figure 19 Dietary diversity score.....45
Figure 20 Daily kilocalories in Food distribution in the last six months.....46
Figure 21 Macro and Micronutrients provided in the food ration.....47
Figure 22 Anaemia prevalence in relation to duration of stay in the camp for Women.....**Error! Bookmark not defined.**
Figure 23 Comparison of Anaemia prevalence between 2008 and 2010 56

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ACRONYMS AND ABBREVIATIONS

AMDA	Asian Medical Doctors Association
ARIs	Acute Respiratory Infections
CHWs	Community Health Workers
CI	Confidence Interval
CSB	Corn-Soya Blend
GAM	Global Acute Malnutrition
Hb	Haemoglobin
ITNs	Insecticide-treated bed nets
MOH	Ministry of Health
MUAC	Mid Upper Arm Circumference
NCHS	National Center for Health Statistics
NGO	Non Governmental Organization
ONARS	Office National d'Assistance aux Réfugiés et Sinistrés
PPS	Proportional to Population size
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SFP	Supplementary Feeding Programme
TFCs	Therapeutic Feeding Centres
TFP	Therapeutic Feeding Programme
WH	Weight for Height
WHM	Weight-for-Height Percentage of the Median
WHO	World Health Organisation
WHZ	Weight-for-Height z-scores

1.0 Introduction

The nutritional and anaemia situation in Ali Adde refugee camp has been poor based on results from the last survey conducted in December 2008 despite several nutrition related activities since the last survey. A prevalence of 12.7% and 2.9% for GAM and SAM in children aged 6-59 months respectively were found in the last nutritional survey. The anaemia situation in 2008 has also been alarming with prevalence as high as 66.6% in children 6-59 months[1]. Infant feeding practices in 2008 were found to be poor and diarrhoea and ARI were found to be the highest causes of under-five morbidity and mortality[1].

The aim of this current survey was therefore to reassess the nutritional status of children 6-59 months by measurement of MUAC, height and weight, oedema together with a retrospective mortality survey over the last 3 months. In addition the survey aimed to determine the prevalence of anaemia among children under five years, women of reproductive age (non-pregnant), and to understand food consumption and infant feeding practices in Ali Adde refugee camp, Djibouti. The measurement of anaemia has been prioritised following the production of an anaemia control and reduction strategy by UNHCR Geneva in 2008, and the initiation of a programme to tackle micronutrient malnutrition. This survey therefore acts as a follow up to the previous nutritional survey recommendation and as well present a baseline information for the lipid-nutrient supplement (LNS) complementary feeding intervention program that is aimed at improving the nutritional status of children in the camp.

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This report summarizes the findings of the nutritional survey. The report also provides recommendations for the improvement of the general public health as well as the nutritional intervention measures to be taken in the camp.

[1] UNHCR Anaemia/Nutrition Survey 2009

2.0 Background

Ali Adde refugee camp in located in Ali Sabieh district of Djibouti at about 25 km from Ali Sabieh town and 110 km from Djibouti city. The camp was established after the collapse of Somalia government to host refugees fleeing from the civil war and has been in existence since 1990[2]. The population of the refugees in the camp has increased by 2337 people from 8915[3] in 2008 to 11,252[4] in 2010. This is associated with the continued conflict between the Somalia TFG (Transitional Federal Government) and the opposition which has caused the displacement of non –combatant civilians to neighbouring countries[5]. About 92.9% of the refugees are Somalis while smaller proportions of Amharic (4.6%), Oromo (2.3%) and Eritrean (0.2%) ethnic groups also exist in the camp[6].

The camp is administered by the Government of Djibouti through the camp commander, under the jurisdiction of the Ali Sabieh Commissioner and the National Emergency and Disaster Relief Organisation. UNHCR is responsible for the protection and humanitarian assistance programmes in Ali Adde camp. The UNHCR and its Implementing Partners provide health services, water and sanitation, shelter and basic non-food items (paraffin, blankets, soap, sanitary towels etc.).

Ali Adde refugee camp, like much of the country, lies in an arid and semi-arid area prone to recurring drought and low economic viability. The climate is hot and humid and temperatures and humidity reach as high as 40°C and 80% respectively. Rainfall is minimal and less than approximately 150mm is received per year. There are no major security problems within the camp and areas surrounding the refugee camp are inhabited by local populations who have also experienced no serious security problems.

[2] UNHCR/ WFP (2009) Joint Assessment Mission Report: Ali Addeh Refugee Camp-Djibouti
[3] UNHCR registration data December 2008
[4] UNHCR registration data December 2010
[5] UNHCR/ WFP (2009) Joint Assessment Mission Report: Ali Addeh Refugee Camp-Djibouti
[6] UNHCR (2007) Mission Report

The majority of the refugees are dependent on food aid from international organisations. There are no other sources of livelihoods for most of the refugees although a few long term refugees have developed some livelihood coping strategies like keeping 2-3 goats for milk. Similarly, some of the long term refugees have their children (especially girls) providing cheap labour in major towns around Djibouti. This is however not very significant as the majority of the refugees fully depend on food aid. Lutheran World Federation (LWF) arrived in the camp in July 2009 and implements primary education activities as well as income generating and micro finance schemes albeit still in its early stages. The United Nations High Commission for Refugees (UNHCR) and the World Food Programme (WFP), in collaboration with other bilateral donors, have been working together, to ensure that food security and related needs of the refugees are adequately addressed. In this respect, WFP, in partnership with other donors, provide the general ration to the refugees in Ali Adde. ONARS (*Office National d'Assistance aux Réfugiés et Sinistrés)* is in charge of the distribution of food and non food items to the refugees in the camp, while WFP and UNHCR monitor the distribution. However, although monitoring of food aid is done there is no weighing of the food basket immediately following distribution (on-site distribution monitoring). This would be important in order to make a confident and objective judgment on the equity and adequacy of the food distributed. Nevertheless, anecdotal evidence suggests that the food distributed is equitable and adequate.

2.1 Health and nutrition

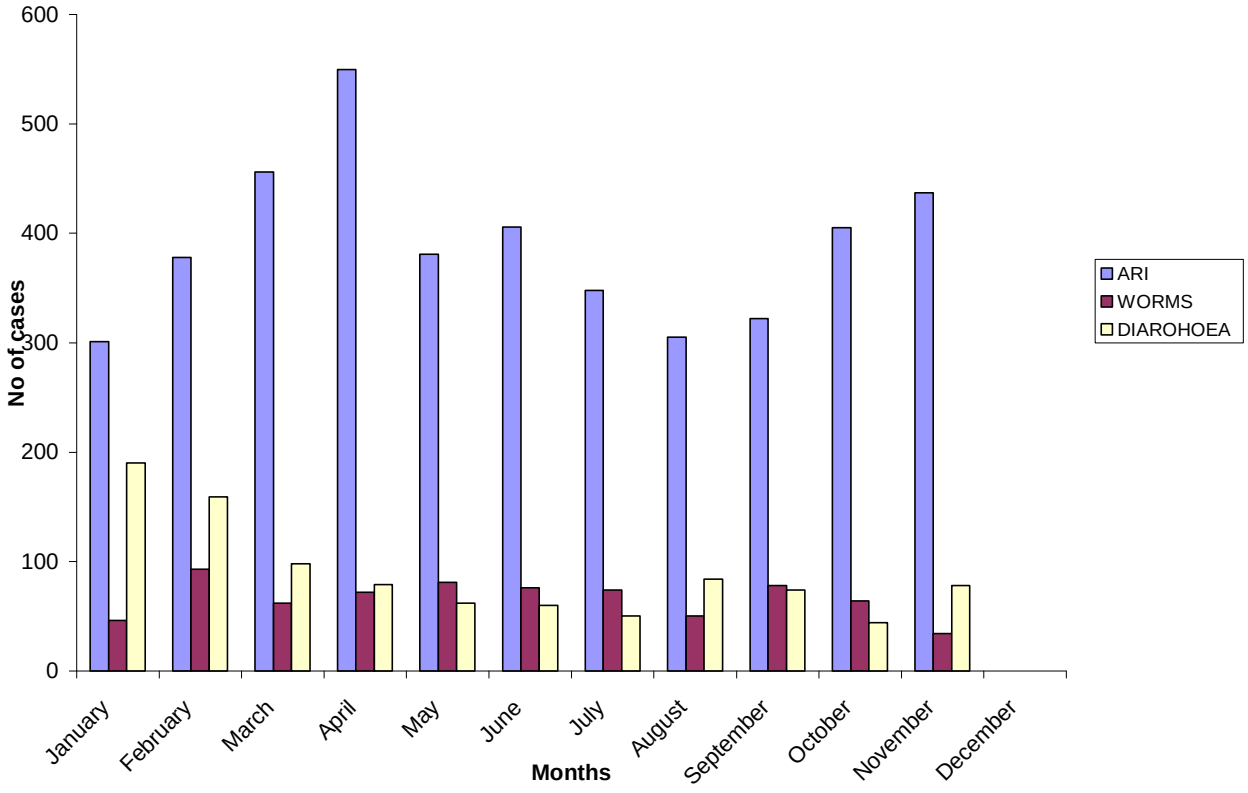
Asian Medical Doctors Association (AMDA), with the support UNHCR provides health, nutrition and sanitation services to the refuges in the camp. The organisation provides out patient care and limited inpatients care. Refugees who require medical care not available in the camp are referred to Ali Sabieh hospital and/or to Djibouti public hospital. Improvement of health care service delivery is apparent and also felt in the refugee community from the last survey in terms of hospital management, infrastructure and staff capacity among others. The health centre is expected to move soon to a new building build and funded by UNHCR in collaboration with the Japanese government.

Acute respiratory infections (ARI), bloody and watery diarrhoea are among the leading causes of morbidity for children under five, with ARI causing the highest morbidity[7]. The camp also experienced a recent outbreak of watery diarrhoea weeks before the survey causing high morbidity due to diarrhoea and death of three under five children: one from the local community and two from the refugees. Specific sections were affected more than others which was thought to be due to relatively poor sanitation, overcrowding, new arrivals and poor social economic status among others. Section 5, 6 and 8 were the most affected sections with section 8 having the highest number of diarrhoea cases[8]

Malaria cases are rare and although there is a high vector presence and breeding sites the species could not be established. Infection with intestinal parasites is high with hookworm and *Ascaris lumbricoides* leading in the list of helminthic infections[3]. There are no specific peaks for these diseases and trends and numbers are reasonably high all through out the year. However, slight peaks are evidenced in the first months of the year as shown in figure 1 below.

[7] AMDA monthly reports statistics
[8] UNHCR Diarrhoea report 2010.

Figure 1 Incidence of common illnesses among children, January- November 2009[9]



The nutritional survey findings over the last three years showed poor and serious nutritional situation in the camp.

Table 1 Trend in acute malnutrition in children 6-59 months in the last three years

Acute malnutrition in children (6-59 months)	June 2006	2007	December 2008
Prevalence of moderate acute malnutrition (%)	5.4	10.7	9.7
Prevalence of severe acute malnutrition (%)	3.0	2.2	2.9
Prevalence of global acute malnutrition (%)	8.4	12.9	12.7

UNHCR recruited a nutrition consultant, following the recommendation from last year's survey, who has been instrumental in the improvement of the nutrition program.

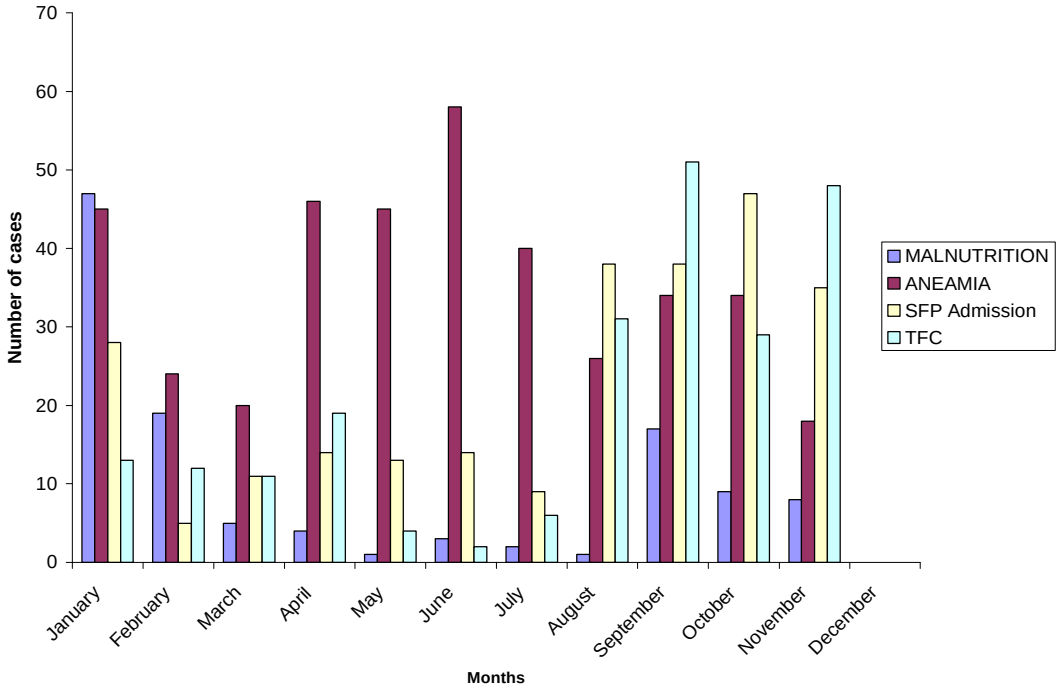
[9] AMDA monthly report data 2008

Improvements in the establishment of the nutrition program in the hospital were evident with improved staff capacity, availability of supplies and adherence to standard guidelines. The program has now been divided into the supplementary feeding program, stabilisation centre and out patient therapeutic centre. A mass MUAC screening and an LNS acceptability study were also conducted in the camp in 2009.

Complementary nutrition program targeting children age 6 months - 2 years using LNS was also established as part of the anaemia control strategy and is in progress since January 2010. Blanket supplementary feeding with CSB for pregnant and lactating and women was also established in the middle of last year. Admissions to the SFP have been high in the latter part of last year which could be related to various key factors including improvement of service delivery at the nutrition department in the hospital and active case finding.

Anaemia prevalence in the camp was very high in the December 2008 survey with a prevalence of 66.6% in children 6-59 months and 44.5% in non pregnant women of reproductive age. Continued anaemia testing was intended to continue in the camp and about six hemoCue machines were provided by UNHCR to AMDA. Currently there are two functional machines in the health centre laboratory, although the testing of haemoglobin has been hampered by lack of cuvettes. It is therefore not clear whether the anaemia reported in the outpatient morbidity data includes patients that were clinically assessed or if they were actually tested for haemoglobin. The number of out patient anaemia cases varied on monthly basis, however there was a mean of 36 cases monthly and there were also noticeable peaks between April and July. The figure below shows the trend in the admission of children under five in both the SFP and TFC and anaemia cases.

Figure 2 Admission to the SFP,TFC[10] and Anaemia cases: January- November 2009



Sanitation programs are provided by AMDA in conjunction with UNHCR. The construction of toilets is through community participation and refugees are encouraged to dig pit latrines and assemble the stones for construction of the wall. AMDA then provides the materials and equipments for the construction. There are about 608 toilets within the camp. However about a third of toilets are said to be partially or completely full which leaves only about 400 usable toilets for the 11,252 people in the camp. Despite the inadequacy of the toilets in the camp, the toilets dug by the refugees are one meter square and therefore only usable for a short time period[11]. Evidence of using the open area for defecation was reported[12]. On the other hand there are many challenges facing the establishment of toilets in the community, due to unwilling people able to participate, lack of adherence to standard requirement etc. The number of new arrivals also poses a high threat to the sanitation due to lack of communal toilets and it is often hard to ask the new arrivals to dig the toilets immediately upon arrival.

[10] The TFC was divided into stabilization centre and out patient feeding centre from June 2009
[11] AMDA reports
[12] UNHCR Diarrhoea report 2010.

Access to and availability of safe drinking water is poor. Water is provided at different levels. Treated water is pumped into the camp, although the supply of the water is intermittent. Ideally water is supposed to be supplied to the sections on alternate days. An average of four jericans (20 lts) is expected to be drawn by every household despite the difficulty of achieving this and the variation of family sizes. Densely populated sections may particularly not be able to access this treated water from the taps making access to portable water a major constraint. The majority of the refugees therefore desperately rely on unprotected shallow wells that are dug along the river bed within the camp. The shallow wells are either individually owned or some are owned by groups of people. On the other hand due to the mountainous landscape of the refugee settlement some areas especially in sections 5, 6 and 8 have poor access to all water sources. The quality of this water is poor and, with limited sanitation in the camps, contamination of shallow well during the rains is likely.

2.2 JAM assessment finding

A joint assessment mission (JAM) lead by UNHCR and WFP was undertaken between 6th and 8th October 2009. The assessment was aimed to gather both qualitative and quantitative information on food security and nutrition, and evaluate whether the assistance given to refugees adhere to international standards. It was also aimed to get an understanding of the positive and negative coping mechanisms and subsequently develop strategies to minimise the negative ones.

A number of key findings were gathered ranging from poor housing facilities, poor water and sanitation, inadequate food ration, poor food distribution set up, poor health care delivery, and shortage of drugs among others. On the other hand the report made a number of recommendations in order to improve the specific sectors and eventually improve the quality of service delivery to the refugees. A few of the recommendations are already in progress. One includes the improvement of the food distribution set up by constructing a shelter at the food distribution unit while there are similar efforts to minimise waiting time and crowd control during food distribution. A pilot multi storage

garden is also in progress with crops like kales, tomato, spinach and swiss chard planted so far and awaiting transplantation. This pilot will help understand the viability of the project in the area. Other recommendations under progress include improvement of shelter, decongesting the health facility and provision of school feeding programme and education curriculum improvement among others.

3.0 Survey Objectives

This survey is part of the annual UNHCR nutritional survey and also serves as a baseline data due to the introduction of complementary feeding for 6-24 months old children using LNS in the camp. The objectives of the survey were

1. To determine the prevalence of global and severe acute malnutrition through measurement of 6-59 months old children
2. To determine the prevalence of anaemia among children 6-59 months and women of child bearing age (15-49 yrs)
3. To assess infant and young children feeding practices using 24 hour recall and morbidity
4. To assess crude and under five mortality rate
5. To assess household eating habits using a modified household dietary diversity score and analysis of food aid ration monitoring data

4.0 Survey Methodology

4.1 Staff training and team organization

The survey was undertaken by four teams with four persons in each team. All the team members were employees of AMDA and included four nurses, four nutrition promoters and eight community health workers. The staff were identified by the AMDA management and apart from four staff, the rest of the team were the same group used in the last nutrition and anaemia survey. The training took place from 22nd – 24th March 2010 and piloting of survey tools was done on the 25th March 2010. The training was officially opened by AMDA medical coordinator and covered the following topics:

- Anaemia causes, signs and symptoms, health impact, risk groups and diagnosis

- The purpose and objectives of the survey
- Anthropometry
- Correct methodology for operating the HemoCue and testing haemoglobin.
- Safety precautions and waste disposal system
- Interviewing techniques and recording of data. Role-play was used to ensure that the interviewers knew how to ask the questions and also how to record the responses accurately
- Cluster and household selection

Practical training sessions were held on anthropometry and sample collection and volunteer children from a household adjacent to the training venue used to provide practice. Practical haemoglobin testing was also done with the survey coordinator taking blood samples of some of the participants. All the participants were then given an opportunity to do the test and get tested as well. A video on how to do the haemoglobin measurement was also shared with the staff in order to strengthen the theory and practical demonstration. Role plays of the questionnaires were done with each team acting as the survey team and a household, and vice-versa. Designated team members were responsible for specific assignment. The nurses were selected as the team leaders and were also assigned to do the haemoglobin measurement due to their better understanding of safety precaution.

Pilot testing was done in section seven sub-section one which was not included in the sampled clusters. Teams visited at least three households and their method of haemoglobin measurement together with the correct filling of questionnaires and weight, height and MUAC measurements were assessed during the pilot. A feedback session was organised after the pilot and further emphasis was done on areas of perceived weakness.

Clusters were assigned to teams randomly. Due to the usual food distribution period at the end of the month, teams were asked to start from sections eight coming towards section one to avoid disruption in the food distribution exercise, which was expected to start from section eight four days after the survey. Regular supervision and support to the

field teams was provided by UNHCR Survey Coordinator, UNHCR Nutrition Consultant, UNHCR Nutrition field assistant and AMDA Community Health Coordinator who spent much of their time working with teams in the field.

4.2 Target Population Groups for the Survey

The table below shows the different target groups that were sampled in each cluster and the measurements taken

Table 2 Target population and procedure

Population group	Procedure
Household	Food intake questionnaire
Infants (0-5 months)	Questionnaire
Children (6-59 months)	Questionnaire, weight, height, oedema, MUAC, haemoglobin measurement,
Women (15-45 years)	Questionnaire, haemoglobin measurement

4.3 Sample Size Calculation

The sample size calculations were carried out using the ENA for SMART software[13] . Data from previous surveys were used to determine the expected prevalence figures to use in the calculation of the sample sizes. The calculation of the sample sizes assumed a total population of 1743[14] for children 0-59 months and 1125 (10%[15]) for women of reproductive age.

4.3.1 Anaemia

The sample size calculation for haemoglobin measurement was 462 for each target group of children 6-59 months and women of reproductive age (15-49 yrs). Assuming at least 0.99 children per household, 16 households were required per cluster. This sample size is

[13] Software used for sample calculation: Erhardt et al (2007) ENA for SMART: Emergency nutrition assessment. www.nutrisurvey.de\ena\ena.html

[14] UNHCR (2008) Ali Adde Refugees Camp Registration Data.

[15] Assuming Women of Reproductive age constitute 10% of the population

based on an assumed prevalence of 66.6%, a desired precision of 7%, a design effect of 2, and 15% refusal.

4.3.2 Global acute malnutrition (GAM, wasting) in children 6-59 months

Based on a GAM prevalence of 12.7% obtained from the 2008 survey, a required precision of +/- 5%, 95% confidence (5% alpha risk) and an expected design effect of 1.5, the minimum sample size required was 399 children + 10% refusal =439.

4.3.3 Mortality rate

Based on an estimated rate of 0.5 dealths/10,000/day[16] and with a desired precision of 0.4, design effect of 2 and recall period of 119 days, the sample size required was 2018 which was equivalent to 425 households allowing for 10% non response. The most common and exact date that could be remembered by all the refugees was the last Islamic holiday -Idd-ul haji (Idd-ul Adha) which was on 27th November 2009 hence the recall period of 119 days.

4.3.4 Infant feeding indicators in children 0 - <24 months

A sample of 110 (91 + 10% refusal) 0 - < 6 month infants was aimed for in addition to the 6-59 month children (i.e. 6 per cluster) so as to allow for the measurement of exclusive breastfeeding. This assumed that the true prevalence of exclusive breastfeeding was 32.6% and that we wished to detect an improvement of 10 percentage points following any subsequent intervention with an alpha risk of 5% and 80% power. In reality, it proved difficult to achieve this required sample size due to the apparently low number of households visited due to time constraints.

4.3.5 Sampling

UNHCR registration data was used for sampling and cluster allocation although these figures were the number of refugees registered in each section and not necessarily the actual number of refugees in the camp or each section. However this data was the only available information on the actual population in the camp. The data therefore includes

[16] UNHCR Nutrition Survey 2008

some absent “refugee” records and as is always the case there are higher absent refugee records in certain sections as compared to others. Section five in this case had a high number of people according to the records. To enable the use of Probability proportional to size (PPS) to allocate clusters, the population of each section and sub-section were compiled and entered into ENA for SMART table and 30 clusters were selected[17].

Selection of the household to start the cluster followed standard nutritional survey practice by using the EPI method. The staff went into the centre of the section or sub-section, spun a pen and counted the number of houses in that direction until the end of the section. The first household to be visited was randomly selected from the list of houses by using random numbers. Staff then moved to the left of each house until all the houses were selected to complete the cluster. If more than one cluster were to be selected from a section/sub-section, the staff moved back to the centre of the section and repeated the selection process to find the start point for the next cluster. One of the clusters allocated to section five sub section one could not capture the 16 households needed for the survey and had to be completed in the next adjacent subsection.

Households were defined as people sharing food. Within each household, all individuals of the appropriate age groups were interviewed and measured. Households were selected within each cluster until the required number of households was obtained. All eligible subjects were invited and encouraged to take part. Absent subjects who were not far from the household or the camp were located or re-visited at least twice. Absent subjects who could not be located or found after at least two visits were not replaced. Attempts were made to locate absent households and only if reliable information was available that the residents of the households were not within the camp did we replace the empty households with the next house on the left.

17 ENA for SMART October 2007, http://www.nutrisurvey.de/ena/ena.html

5.0 Data Collection

All the questionnaires and anthropometric and haemoglobin measurements were performed in the household and data entered in their respective data collection sheets.

5.1 Measurement of Haemoglobin

Measurement of haemoglobin (Hb) was performed using a portable photometer 'HemoCue Hb 301[18]. Haemoglobin measurement was done on all children aged 6-59 months and women, in all 16 households in every cluster.

The first drop was allowed to form and wiped away using tissue paper. The second drop was transferred into a HemoCue cuvette for the measurement of haemoglobin. The cuvette was filled from one drop using a continuous action and any blood was wiped away from the faces of the cuvette with lint free tissue before immediate insertion into the photometer. All the HemoCue machines were controlled before the start of the survey and at mid point using HemoCue controls of low, normal and high values. None of the readings were beyond the expected ranges of the controls. The table below shows the cut off values used to define anaemia in this study based on the cut-off recommended by WHO[19].

Table 3 Cut-off Points for Defining Anaemia[10]

Age/Sex groups	**Haemoglobin g/dl**			
	Total	Mild	Moderate	Severe
Children 6 - 59 months	<11.0	10.9 - 10.0	9.9 - 7.0	< 7.0
Adult females >15 years	<12.0	11.9 - 11.0	10.9 - 8.0	< 8.0
Pregnant Women	<11.0	10.9 - 10.0	9.9 - 7.0	< 7.0

[18] HemoCue AB, Box 1204, SE-262 23 Angelholm, Sweden.
[19] The management of nutrition in Major Emergencies, WHO, 2000

In population anaemia surveys classification of anaemia according to severity of anaemia is important in order to understand the public health significance of the problem in the population. The table below gives the different classification of public health significance of anaemia for population assessments.

Table 4 Classification of the public health significance of anaemia in populations on the basis of prevalence estimated from blood levels of haemoglobin[20]

Category of public health significance	Prevalence of anaemia (%)
Severe	≥ 40
Moderate	20.0 – 39.9
Mild	5.0 – 19.9
Normal	≤ 4.9

5.3 Anthropometric Measurements

Anthropometric measurements were taken on all children 6-59 months in 16 households in every cluster. Weight measurement was done using the digital Seca Gmbh and Co. (Model 88102165g). Older children were asked to stand on the digital scale. In children who could not stand alone on the scale the mother's weight was taken first and subsequently zeroed and thereafter the child was given to the mother while she was standing on the scale and the weight of the child was recorded.

Height or length was taken using a Shorr Infant-Child-Adult Height Board [21] to the nearest mm. Children less than 24 months old were measured lying down while children from 24-59 months were measured standing. Oedema was assessed by placing thumb pressure on to both feet of the children for a period of three seconds and thereafter observing for the presence or absence of an indent. All oedema cases reported by the

[20] World Health Organization. 2001. Iron Deficiency Anaemia: Assessment, Prevention, and Control. *A guide for programme managers.*WHO/NHD/01.3

[21] Shorr Productions, USA

survey team were verified by either the UNHCR Nutrition Consultant or the Survey Coordinator.

The acute malnutrition prevalence was estimated from the weight for height (WH) index values combined with the presence of oedema. The WH indices were calculated using the NCHS Reference 1977 and WHO Growth Standards 2006[22] . The table below gives the classification of the WH indices expressed in Z-scores.

Table 5 Definitions of acute malnutrition using WFH and/or oedema in children aged 6–59 months[23]

Category of acute malnutrition	Z-scores	Oedema
Severe acute malnutrition	< -3 SD	Yes/No
	> -3 SD	Yes
Moderate acute malnutrition	< -2 SD and ≥ -3 SD	No
Global acute malnutrition	< -2 SD	Yes/No

Mid upper arm circumference (MUAC) was taken in children between 6-59 months old in all 16 households in every cluster. MUAC measurement is a useful tool for rapid screening of children at higher risk of mortality and therefore not recommended for children below 12 months. Analysis of this data focuses on children above one year of age. The measurement of all the children in the household was deliberately done in order to avoid too many instructions to the survey team.

MUAC was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured using TALC MUAC tape to the nearest mm. Table 6 below provides details of the classification of different MUAC measurements.

[22] NCHS: National Center for Health Statistics (1977) NCHS growth curves for children birth-18 years.United States. Vital Health Statistics. 165, 11-74.
[23] SMART METHODOLOGY Version 1 2006. Measuring Mortality, Nutritional Status, and Food Security in Crisis Situations

Table 6 Guidelines for Classification of Malnutrition based on MUAC[24]

MUAC reading	Categories of Malnutrition
MUAC < 11.5cm	Severe malnutrition and high risk of mortality
MUAC ≥ 11.5cm and <12.5cm	Moderate malnutrition and moderate risk of mortality
MUAC ≥ 12.5 cm <13.5 cm	At risk of malnutrition
MUAC ≥ 13.5 cm	Adequate nutritional status

5.4 Food intake status of the households

Information on the number of meals usually eaten and the number of meals eaten on the day preceding the survey was solicited to establish the food security status of the households. Similarly, information on the family member/s that missed a meal the day preceding the survey and the reasons for missing the meal/s were asked. Food ration adequacy and the duration that the ration lasted, together with coping mechanism when the ration runs out, were also sought. Households were also asked to account for the type of foods eaten the previous day starting with the food eaten in the morning.

5.5 Information on Infant Feeding Practices

Information on exclusive breastfeeding, initiation of breastfeeding following delivery, the timely introduction to complementary feeding and frequency of feeding were sought. Diversity of complementary feeding was investigated using the internationally recommended 24 hour recall method.[25] Vaccination history was taken from the vaccination cards and verbal reports were accepted if the card was not available. The availability or absence of the vaccination card was also noted in the questionnaire.

24 WHO and UNICEF. (2009) WHO Child Growth Standards and the identification of severe acute malnutrition in infants and children. A joint statement by the WHO and UNICEF.

25 Food Agriculture Organisation. 2007.Guidelines for Measuring Household and Individual Dietary Diversity. Rome, Italy

5.6 Morbidity and Mortality data

Parents were asked about history of diarrhoea, acute respiratory infections, fever and suspected malaria of their children in the last two weeks preceding the survey. They were also asked about action taken in case of diarrhoea in terms of use of oral rehydration salt (ORS) and fluid intake. Mortality data was collected using the method recommended by SMART[26]. The crude mortality rate (CMR) and the U5 mortality rate were calculated by using ENA software and expressed in number of deaths per 10,000 people per day. The last iddul haji was used as the beginning of the recall period (total recall period of 119 days). The formula below was applied:

Crude Mortality Rate (CMR) = 10,000/a*f/ (b+f/2-e/2+d/2-c/2)

Where:
a = Number of recall days
b = Number of current household residents
c = Number of people who joined household during recall period
d = Number of people who left household during recall period
e = Number of births during recall period
f = Number of deaths during recall period

5.7 Collection of Questionnaire Data

Five separate questionnaires (data collection forms) were developed and used for infants, children 6-59 months, women, food consumption and mortality data. The questionnaires were formulated in English, translated into Somali and then field-tested and revised prior to use in the survey. Questions were addressed to the subjects in Somali. All survey staff conducting the interviews were native Somalia speakers and fluent in Somali. Age and date of birth were collected from vaccination cards for infants and children, when available and by verbal recall for women. The interviewers used a calendar sheet to determine age.

5.8 Qualitative data collection

Time did not permit the implementation of focus group discussions and hence qualitative data collection was limited to key informant interviews and observations. Key informants

[26] SMART 2006. Measuring Mortality, Nutritional Status and Food Security in Crisis Situation: Smart Methodology

included AMDA medical doctor, Community health Coordinator, nutrition department staff, ONARS, Refugee Section Leaders and parents of children.

5.9 Data Management

Data was entered and stored in five separate data files in Epi data corresponding to the different target groups and indicators assessed: infant, children 6-59, women, household and mortality. Each household was assigned a unique ID based on the cluster number and household number i.e 23/09 for household number nine of cluster 23. Data cleaning was done by running frequency tables and distributions in order to check for outliers and repeated entries. Data cleaning was done after the entry of every four clusters and the data entry person together with the survey coordinator reverted to the hard copies of the data collection forms in order to resolve any anomalies that were discovered.

Data was imported from Epi data to SPSS (Version 16.0 for analysis. Excel spread sheets were used for graphical presentation. Child anthropometry data was exported to excel and subsequently imported into ENA for SMART software (Version October 2007) for data cleaning, validation and data analysis. Plausibility checks were done on the children anthropometric data stored in ENA for SMART software to check for possible errors and data quality.

5.10 Ethics and Informed Consent

The aim and objectives of the survey were discussed and agreed with members of the Ali Adde refugee camp (AMDA, UNHCR and Section leaders etc). Information about the survey was disseminated to the refugees through their respective section leaders before the commencement of the survey. Verbal approval of the survey was sought from the section leaders before the survey, which was granted unanimously by all section leaders. During the survey when teams arrived at a household they first explained the purpose of the survey and explained the procedures to be undertaken as well as the duration it might take. Similarly the pain inflicted by the prick was explained as well and it was made clear that the selected subjects could either accept or reject participation and there would be no negative consequences and nothing would happen to the participant's routine service

delivery in the camp. The teams also stressed that the information the participants give had no direct effect on their ration cards, health care and other services. This was particularly important in order to get reliable information on the dietary diversity score as well as the mortality information. Verbal consent was taken for all the measurement and procedures. Verbal consent was sought from the parents of children and individual consent was taken from women. Use of written consent was found not very helpful given the high illiteracy rate and also for the complexity and sensitivity of the community to signing documents even if they accept what is been asked for. All records collected during the survey were considered as confidential.

5.11 Implementation Schedule

The survey was scheduled to start on 16th March but unfortunately called off due to the declaration of a diarrhoea outbreak in the camp by AMDA. Both the Survey Coordinator and the Nutrition Consultant were then involved in the control, prevention and investigation of the outbreak in the camp for a period of a week. The nutrition survey training then started on 22nd March 2010 and the actual field work started on 26th March to 2nd April 2010 after 4 days training and pilot testing. A detailed schedule of the survey work undertaken in Ali Adde is provided in annex 2.

5.12 Logistics

UNHCR Djibouti provided transport during training and survey period as well as materials for both the survey and training. ONARS provided the training venue and AMDA provided staff for the survey and as well as some consumable supplies and survey equipments.

6.0 Results

Data collection lasted eight days from 26 March to 2nd April 2010. There were no major problems during the training as well as during the survey. Most households visited were receptive and there were no refusal of household to participate in the survey. The availability of on the spot testing for haemoglobin is thought to have increased the participation.

Table 7 summarises the number of people sampled during the survey in the different population groups and their ages and gender.

A total of 16 households per cluster were visited in 30 clusters giving a total number of 480 households. The head of the household was interviewed on the dietary diversity, food ration adequacy and coping mechanisms among other collected information.

A total of 469 women of reproductive age were captured for haemoglobin measurement during the survey. However among this number, 76 were pregnant women who were measured to let them know their haemoglobin status but not included in the analysis. This is mainly because haemoglobin concentration is affected by gestational age and the possibility of getting an accurate gestational age measurement was thought to be hard. Data was therefore analysed on 393 non pregnant women who fell within the desired age range of 15-49 yrs.

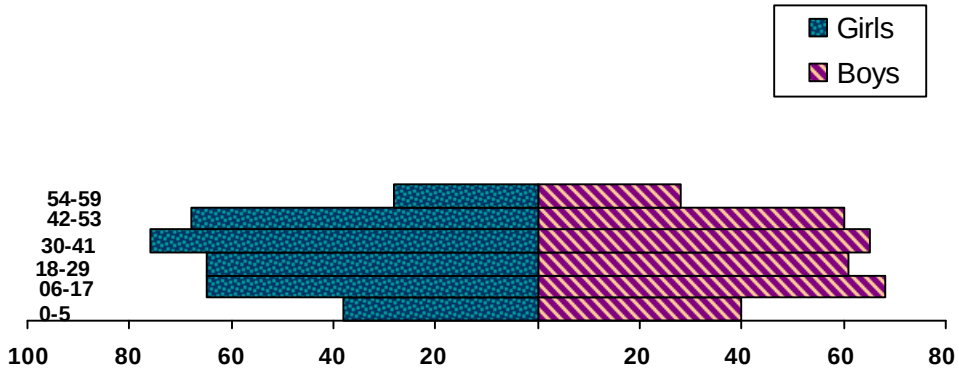
Information was collected on a total of 663 children aged 0-59 months. About 10 children captured in the mortality questionnaire could not be found at home hence not measured. A total of 78 infants aged between 0-5 months were captured during the survey for infant and young feeding practices questions while a total number of 585 children aged 6-59 months were surveyed for feeding practices, haemoglobin, immunization status and anthropometric measurements. Anthropometric data was analysed on 584 children which excluded 11 children that had either age above 59 months or incorrect information on the weight or height. A total of 585 children aged between 6-59 months were analysed for haemoglobin..

The gender distribution was in the acceptable range of 0.9 - 1.0. The age range of 54-59 months was, as expected, slightly lower with about 9.6% of the sample children being in that age range. The gender distribution in the infants (0-5 months) was similarly within acceptable range. Figure 3 shows the age –sex pyramid of the sampled children population.

Table 7 Characteristics of the population sample groups

Population Group	Eligible Age Range	N	Actual Age range	Mean Age	Median Age	% Male	% Female
Infants	0-5 (Months)	78	0-5	2.6	3	51.3	48.7
Children	6-59 (Months)	585	6-61	32.7	32	48.4	51.6
NP Women	15-49 Yrs	393	12-60	31.5	31	-	100%

Figure 3 Age-Sex pyramid of the sample children population



The age and sex distribution of children included in the anthropometric data is shown in table 9 below. Both gender were equally distributed in all age groups and there were no significant differences in the age or sex distribution of the subjects.

Table 8 Distribution of age and sex of 6-59 Months Children

Age Class	Boys		Girls		Total		Ratio
Months	No.	%	no.	%	no.	%	Boy:Girl
6-17	68	51.1	65	48.9	133	22.8	1.0
18-29	61	48.4	65	51.6	126	21.6	0.9
30-41	65	46.1	76	53.9	141	24.1	0.9
42-53	60	46.9	68	53.1	128	21.9	0.9
54-59	28	50.0	28	50.0	56	9.6	1.0
Total	282	48.3	302	51.7	584	100.0	0.9

6.1 Anaemia

Of 585 children tested for anaemia, 42.4% (95% CI, 38.5-46.4) were anaemic (<11 g/dl). There was a significant difference (p=0.03) between the boys and girls with an anaemia proportions of 47.0% (95% CI, 41.3-52.8) and 38.1% (95% CI, 32.8-43.7) for boys and girls respectively. The mean haemoglobin level in children was 11.0 g/dl with a range of 5.4- 14.4 g/dl. Prevalence of anaemia was lower in women of reproductive age (non pregnant) thought not significant (P=0.323) as compared to the children with 37.9 % of

the non pregnant women being anaemic. Severe anaemia was low for both groups with each having a prevalence of 1.5%. Most of the anaemic cases were either moderate or mild. There was no association between haemoglobin concentration and consumption of tea or amount of tea consumed (p=0.608). The table below summarises the prevalence and severity of anaemia in children and non-pregnant women of reproductive age.

Table 9 Haemoglobin level and prevalence of Anaemia

Population Group	N	Mean Hb g/dl (SD)	Range (g/dl)	Total Anaemia (95% CI)	Mild Anaemia (95% CI)	Moderate Anaemia (95% CI)	Severe Anaemia (95% CI)
Children 6-59 months	585	11.0 (±1.4)	9.0	42.4 (38.5-46.4)	21.7 (18.6-25.2)	19.1 (16.2-22.5)	1.5 (0.8-2.9)
NP Women 15-45 years	393	12.3 (±1.5)	10.4	37.9 (33.3-42.8)	21.6 (17.8-26.0)	14.8 (11.6-18.6)	1.5 (0.7-3.3)

The levels of anaemia in children 6-59 months in Ali Adde refugee camp is still at severe situation according to WHO cut-offs despite the high reduction of anaemia in this group as compared to the previous 2008 survey. The prevalence of anaemia in non pregnant women of reproductive age is at moderate level although the confidence intervals indicate borderline to severe situation according to the WHO cut-offs.

Figure 4 Distribution of Haemoglobin Concentration in Children 6-59 Months

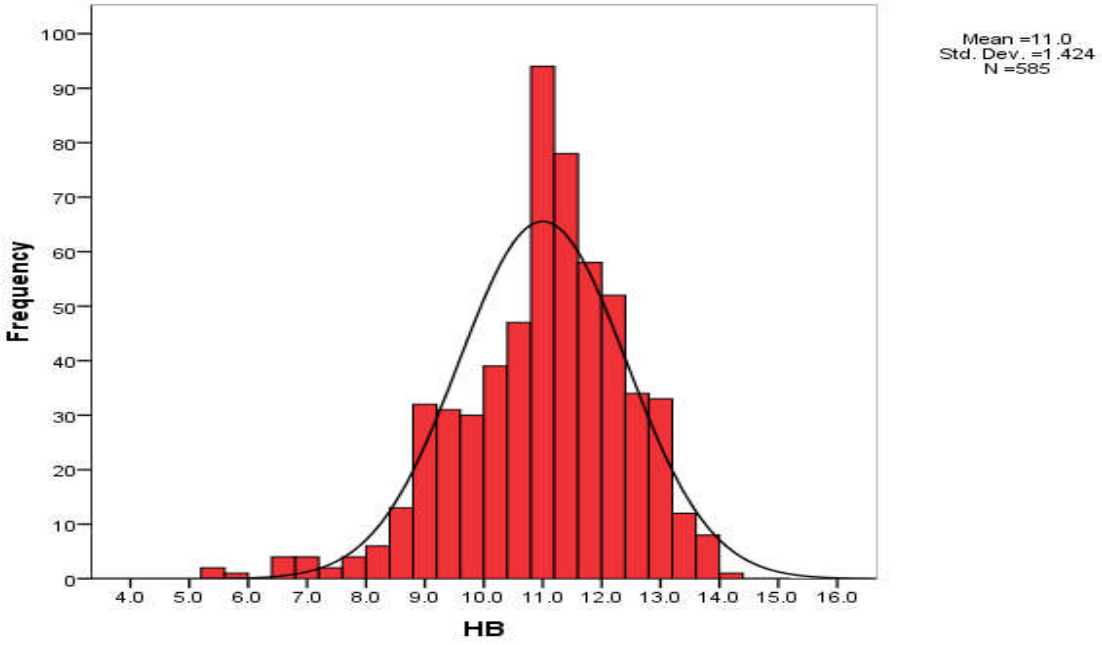
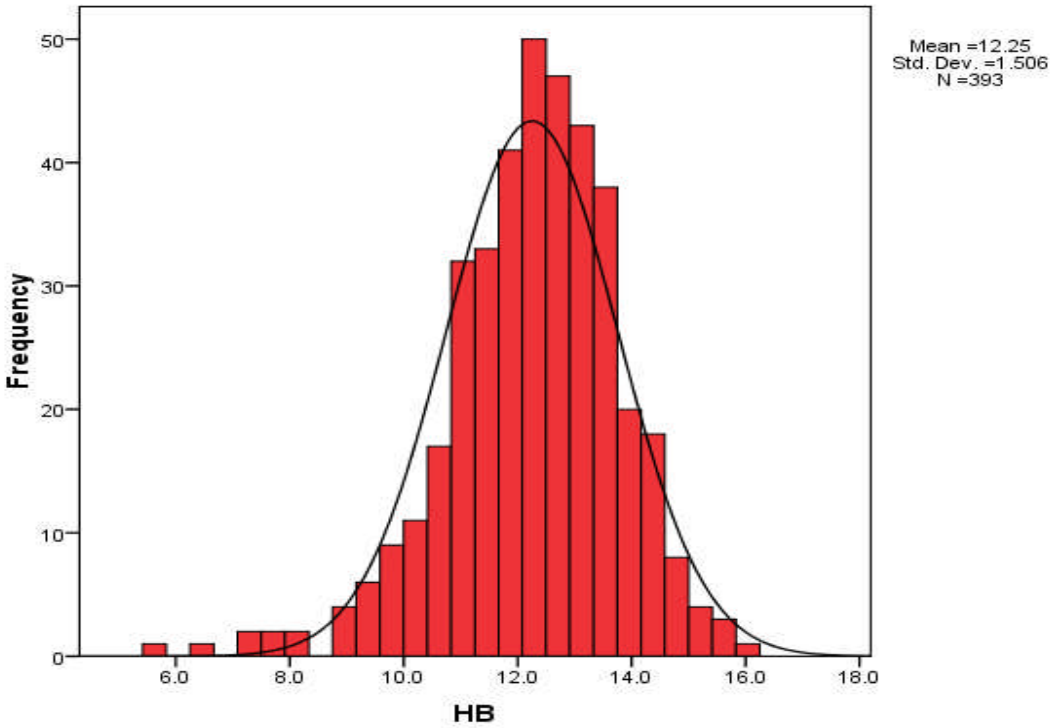
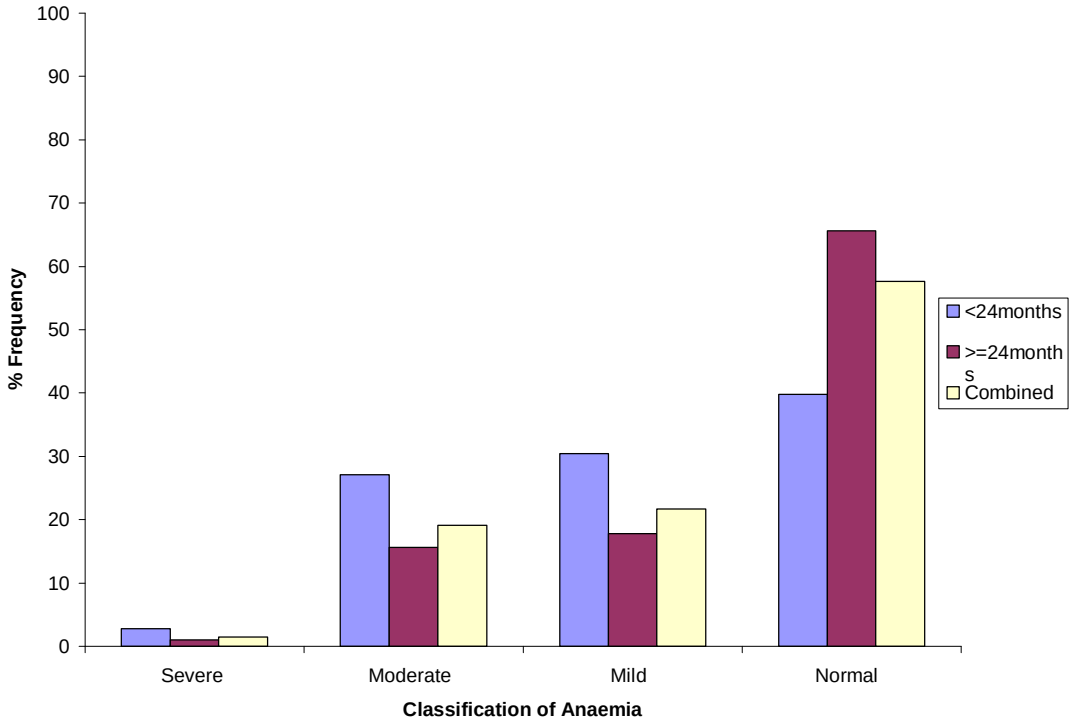


Figure 5 Distribution of Haemoglobin Concentration in Non Pregnant Women



A significant difference in the prevalence of anaemia (P<0.001) was found in children lower than 24 months as compared to children above 24 months with the younger age group having about twice as much anaemia [60.2% (95% CI, 53.0-67.1)] as compared to the older age group [34.4 % (95% CI, 30.0-39.2)]. The mean haemoglobin was 10.5 g/dl (SD 1.5) and 11.2 g/dl (SD1.3) for groups under 24 months and those above 24 months, respectively. It is however important to interpret this data with caution considering that the proportions sampled are not equal with 181 and 404 children for those below and above 24 months respectively. The figure below shows the distribution of anaemia in the two categories of children.

Figure 6 Haemoglobin level Classification by age set category



6.2 Anthropometry in 6-59 month children

The overall prevalence of global and severe acute malnutrition is shown in table 10 and a breakdown of acute malnutrition by age is given in table 11. The analysis was performed on 584 children excluding the out of range values identified using the ENA for SMART software (Version 2007). For data cleaning, the range of +4 and -4 Z- scores from the

sample mean was used and values beyond these z scores (SMART flags) were flagged and not included in the analysis. Prevalence is given for the weight for height (WH) indices in z-scores using both the NCHS Reference 1977 and WHO Standards 2006 data and % of the median, using the NCHS Reference 1977. One bilateral oedema case was found that was of kwashiorkor type.

Table 10 Prevalence of Acute Malnutrition in Children

Acute Malnutrition	Global (95 % CI) (<-2 z-scores or <80% and/or oedema)	Moderate (95 % CI) (<-2 z-score and >=-3) or (<80% and >= 70%) no oedema	Severe (95 % CI) (<-3 z-scores or <70% and/or oedema)	Mean (± SD)
WFH z-score (NCHS 1977)	16.5 % (13.0 - 20.7)	13.4 % (10.7 - 16.7)	3.1 % (1.8 - 5.4)	Add value
WFH z-score (WHO 2006)	16.9 % (12.9 - 21.9)	10.8 % (8.0 - 14.5)	6.1 % (4.0 - 9.2.)	Add value
WFH % median (NCHS 1977)	12.2 % (9.0 - 16.7)	9.8 % (7.1 - 13.7)	2.4 % (1.3 - 4.4)	-

Figure 7 Distribution of Weight for Height z-scores in 6-59 Months

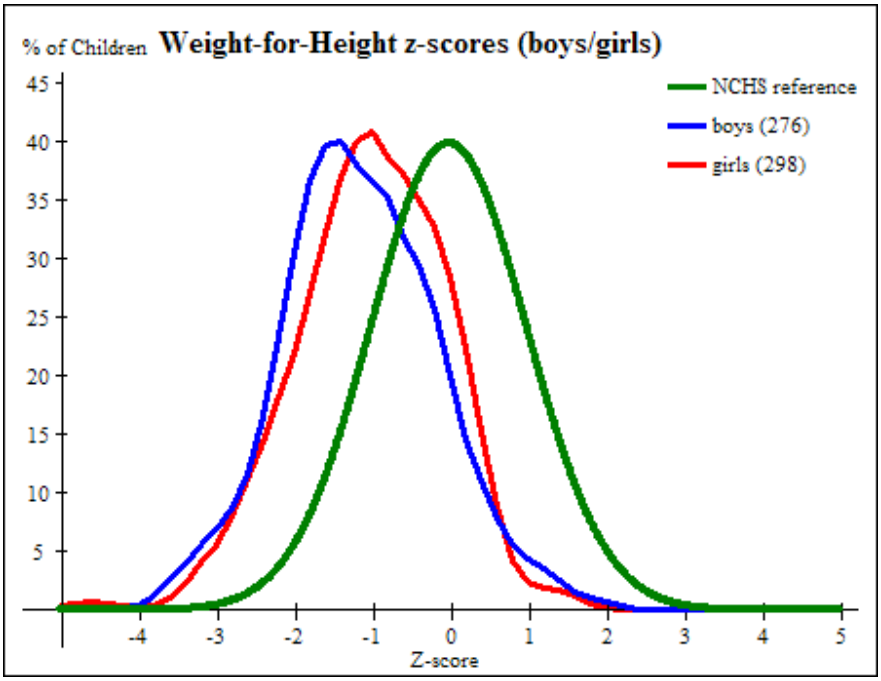
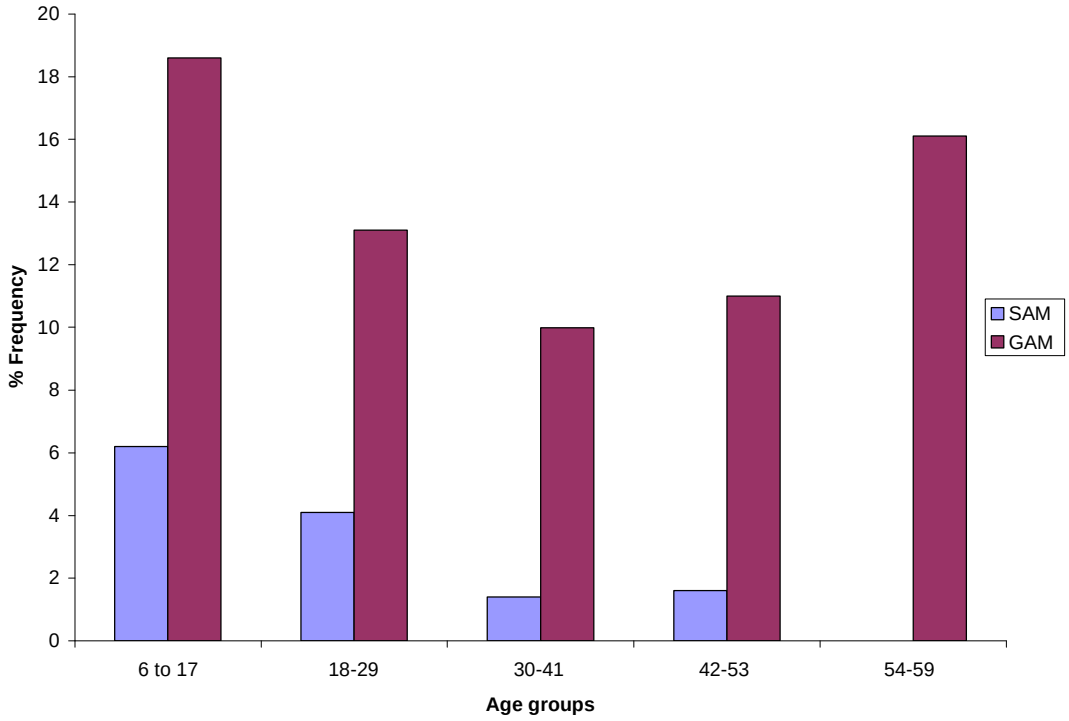

% of Children
Weight-for-Height z-scores (boys/girls)
NCHS reference
boys (276)
girls (298)
45
40
35
30
25
20
15
10
5
-4
-3
-2
-1
0
1
2
3
4
5
Z-score

Table 11 Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema

Age Class (months)	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
	No.	%	No.	%	No.	%	No.	%
6-17	8	6.2	24	18.6	97	75.2	0	0.0
18-29	5	4.1	16	13.1	100	82.0	1	0.8
30-41	2	1.4	14	10.0	124	88.6	0	0.0
42-53	2	1.6	14	11.0	111	87.4	0	0.0
54-59	0	0.0	9	16.1	47	83.9	0	0.0
Total	17	3.0	77	13.4	479	83.4	1	0.2

Figure 8 Prevalence of Malnutrition by age category based on weight-for-height z-scores



There are some patterns in malnutrition prevalence across age groups. The two extreme age groups at the lower and upper ends show a relatively higher prevalence of GAM

whereas the SAM prevalence seems to decrease with age group with the lowest age group having the highest.

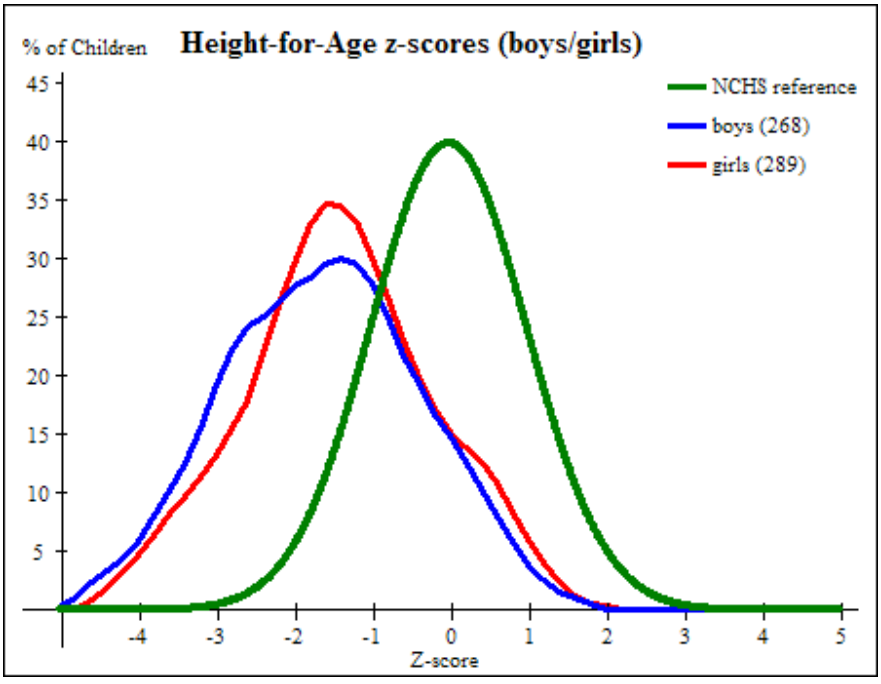
6.3 Chronic Malnutrition (Stunting)

The prevalence of chronic malnutrition (stunting) is given in table 12 and the distribution of HFA z-score indices by sex is given in figure 9. Girls had a significantly higher prevalence of stunting [38.8% (95% CI, 31.8-46.3)] as compared to the boys [29.1% (95% CI, 22.7-36.3)] (P=0.033).

Table 12 Prevalence of Chronic Malnutrition in Z-scores (Stunting) in Children

Chronic Malnutrition	Global (95 % CI) (<-2 z-scores)	Severe (95 % CI) (<-3 z-scores)	Mean (± SD)
HFA z-score	33.8 % (28.2 - 39.9)	11.8 % (9.0 - 15.5 95% C.I.)	-1.52±1.20

Figure 9 Distribution of Height for Age Z score (stunting)



6.4 Malnutrition based on MUAC for the Refugee Camp

The average MUAC in children 1-5 years was 14.7 cm ± 1.3 (n=531).The prevalence of total malnutrition of children based on MUAC was 4.8 % as shown in table 13. This prevalence of total malnutrition based on MUAC <13.5 cm is lower than the global acute malnutrition based on WHZ scores of 16.5% (NCHS 1977) .This is usually expected as in many cases the prevalence of malnutrition based on MUAC is lower than the prevalence based on WHZ score. This is partly due the exclusion of a large sample of children aged 6 -11 months in the MUAC measurement due to possible inaccuracies in measurement. On the other hand MUAC is mainly a measure of risk of mortality[27] and is partly biased towards younger children[28]. This is therefore evidenced in this data where the younger age groups show a higher prevalence of malnutrition of 16.5% and 6.4% in children 12-17months and 18-29 months respectively as opposed to higher age category of 42-53 months and 54-59 months of 2.3% and 0% respectively.

Table 13 Malnutrition prevalence based on MUAC

Age Class (months)	**Severe <11.5 cm**		**Moderate 11.5–<12.5 cm**		**At Risk 12.5-13.5 cm**		**Total Malnourished**		**Normal >13.5 cm**		**Total**
	No.	%	No.	%	No.	%	No.	%	No.	%	
12-17	3	3.8	10	12.7	18	22.8	13	16.5	48	60.8	79
18-29	1	0.8	7	5.6	22	17.5	8	6.4	96	76.2	126
30-41	0	0	1	0.7	10	7.1	1	0.7	130	92.2	141
42-53	0	0	3	2.3	2	1.6	3	2.3	123	96.1	128
54-59	0	0	0	0	1	1.8	0	0	55	98.2	56
Total	4	0.8	21	4.0	53	10.0	25	4.8	452	85.3	530

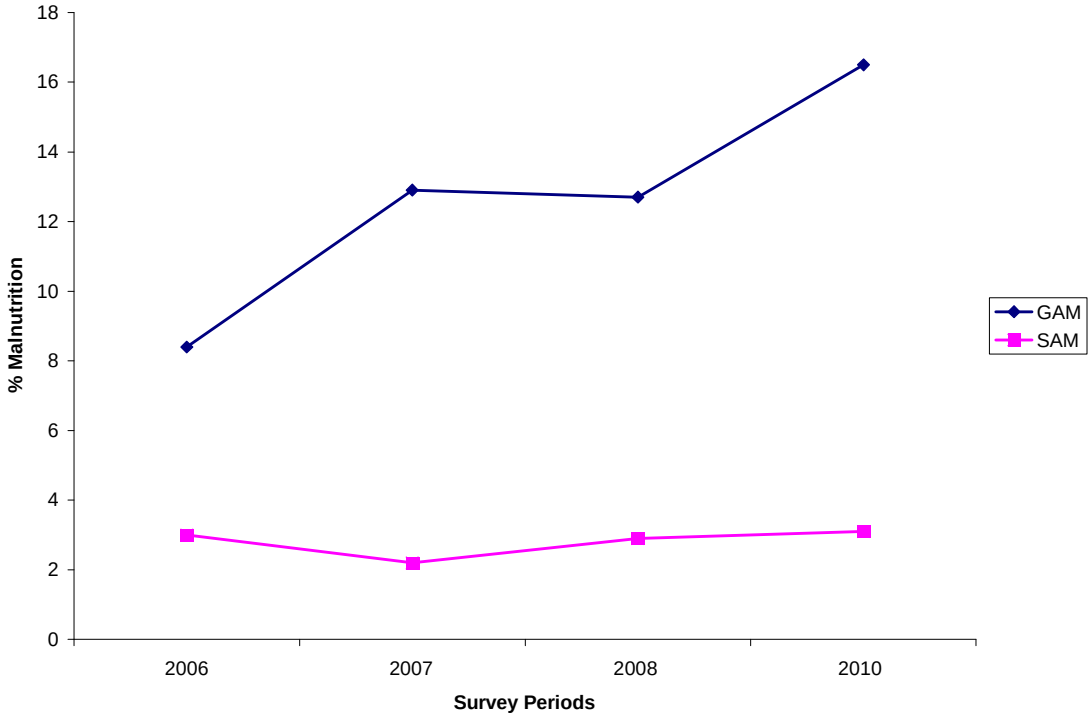
[27] Nutrition Working Group. 2006. Nutrition Assessment Guidelines: recommendations for Somalia

[28] The Sphere Project. 2004. Humanitarian Charter and Minimum Standards. Overall Handbook Structure. www.oxfam.org.uk/publications

6.4 Trends in malnutrition in Ali Adde refugee camp 2006-2010

As shown in Figure 10 below the prevalence of GAM has been on an upward trend since 2006 whereas the prevalence of SAM has remained more or less stable. As compared to the 2008 survey, a higher prevalence of moderate acute malnutrition was found in this survey, which can be partly attributed to the recent outbreak of diarrhoea. It is however important to note the increase in GAM was not statistically significant (P=0.290).

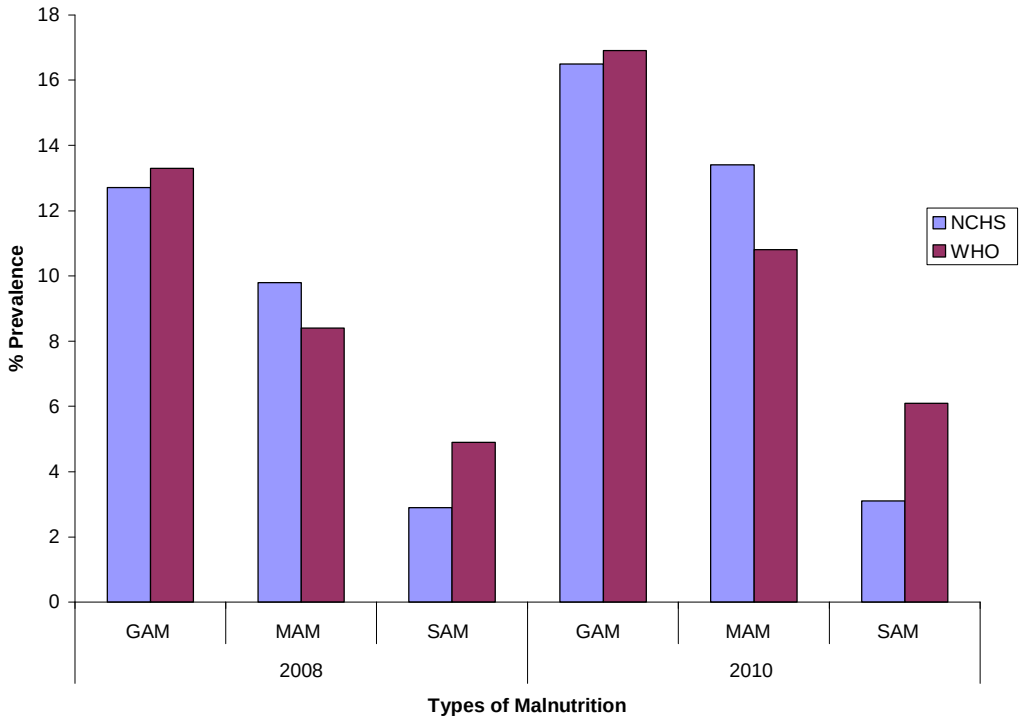
Figure 10 Trends in Malnutrition in Ali Adde refugee camp 2006-2010



Comparing the prevalence of malnutrition in 2008 and 2010 using both the NCHS Reference 1977 and WHO Standards 2006, there is an increase in the prevalence of severe acute malnutrition using WHO 2006 growth standard. This is however expected as the new WHO standards results into increased SAM through increasing the value of the weight for height <-3 z-scores cut-off[29]. This is shown in figure 11 below.

[29] Marko Kerac and Andrew Seal 2006. Operational implications of using 2006 World Health Organization growth standards in nutrition programmes: secondary data analysis

Figure 11 Comparison of Prevalence of Malnutrition using both NCHS and WHO 2006 growth reference



In addition to the diarrhoea outbreak occurring before the survey, it was noted that the nutrition program in the camp experienced receiving less amount of supplementary product from WFP, even though admission to the program was increased since August 2009 as shown in the table below. Reduced supplementary products was noted from records and subsequently many children are thought to have remained for prolonged time in the correction of moderate malnutrition. However improved supply of supplementary products was reported by AMDA from February 2010.

Table 14 Supplementary food program August –December 2009

Months	Beneficiaries	Supplementary food required in Metric tone				Actual supplied in Metric tone (MT)				Shortfall in MT
		CSB	Sugar	Oil	Total	CSB	Sugar	Oil	Total	
August	313	2.08	0.33	0.19	2.6	1.65	0.26	0.15	2.06	0.54
September	328	2.18	0.34	0.2	2.72	1.16	0.15	0.15	1.46	1.26
October	441	2.93	0.46	0.27	3.66	0	0	0	0	3.66
November	554	3.69	0.58	0.34	4.61	1.65	0.26	0.15	2.06	2.55
December	540	3.59	0.57	0.33	4.49	1.65	0.26	0.15	2.06	2.43

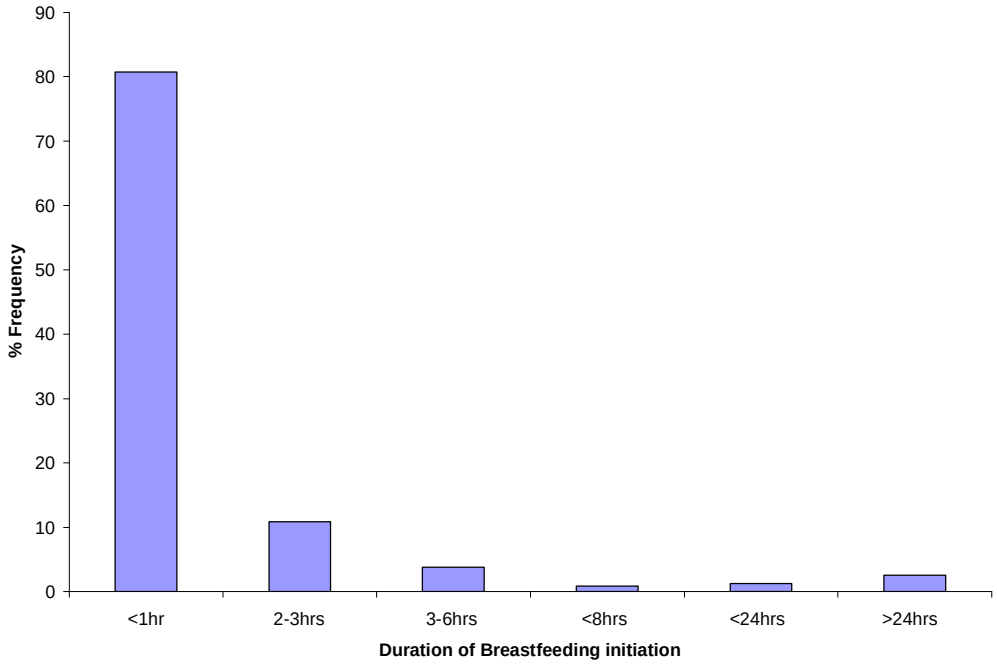
6.5 Infant and Young feeding practices

The key infant feeding and morbidity indicators are summarized in table 14 below. The prevalence of timely initiation of breast feeding was high with 80.8% (95% CI, 75.3-85.3). This indicator defines the number of infant or children who were put to the breast within 1 hour of birth. The indicator assesses whether mother's initiate breastfeeding within one hour after birth which has both benefits to the mother and the baby as well. This indicator therefore shows a good number of women initiating early breastfeeding in Ali Adde refugee camp. As shown in the figure 12 below over 90% of the mothers reported initiating breastfeeding less than 3 hours after delivery. Only 2.5% of the mothers said they initiated breastfeeding after 24 hours.

Table 15 Indicators of Morbidity and Infant and Young Child Feeding Practices

Indicator	Sampled Age Range	N	Prevalence % (95% CI)
Timely Initiation of Breastfeeding	0-23	239	80.8 (75.3-85.3)
Exclusively Breastfed (<6 months)	0-5	78	23.1 (15.1-33.6)
Exclusively Breastfed (<4 months)	0-3	52	28.9 (18.3-42.3)
Continued Breastfeeding at 12 months	12-16	54	81.5 (69.2-89.6)
Continued Breastfeeding at 24 months	20-23	19	31.6 (15.4-54.0)
Timely Complementary Feeding	6-10	45	77.8 (63.7-87.5)
Reported Prevalence of Diarrhoea	0-23	259	25.9 (20.9-31.5)
Continued Normal Feeding During Diarrhoea	0-23	68	73.5 (62.0-82.6)
Increased Feeding During Diarrhoea	0-23	68	0 (0)
Use of ORS during Diarrhoea	0-23	68	82.1 (71.3-89.5)
Reported prevalence of ARI	0-23	259	49.4 (43.4-55.5)
Reported prevalence of Suspected fever	0-23	259	13.5 (9.9-18.2)

Figure 12 Initiation of Breastfeeding after birth



The Exclusive Breastfeeding indicator shows the percentage of infants 0 - 5 months and 0-3 months who are currently being exclusively breastfed, i.e., who are receiving only breast milk and no water, other liquids or solids. Drops or syrups of vitamins, mineral supplements, or medicines are allowed. This indicator provides a measure of the degree to which women have adopted behaviours consistent with the WHO recommendation that infants should be fed exclusively on breast milk from birth to about six months. As seen in table 15, the prevalence of exclusive breastfeeding was 28.9% (95% CI, 18.3-42.3) and 23.1% (95% CI, 15.1-33.6) in 0-3 and 0-5 months respectively. In general both prevalence estimates are low and it is evident from the 24 hour recall of infant feeding that most women gave plain water to their children.. This however is contrary to the WHO definition of exclusive breastfeeding. And with the poor availability of safe water and the poor development of the child immune system, the likelihood of introducing water borne infections are high.

The prevalence of continued breastfeeding at 12 months and at 24 months measure the percentage of children 12- 16 and 20-23 months who are breastfed. This therefore is a

measure of the breastfeeding duration. The prevalence of continued breastfeeding was 81.5% (95% CI, 69.2-89.6) and 31.6% (95% CI, 15.4-54.0) for children 12-16 months and 20-23 months respectively. This implies that more than half of the women stop breastfeeding earlier than two years.

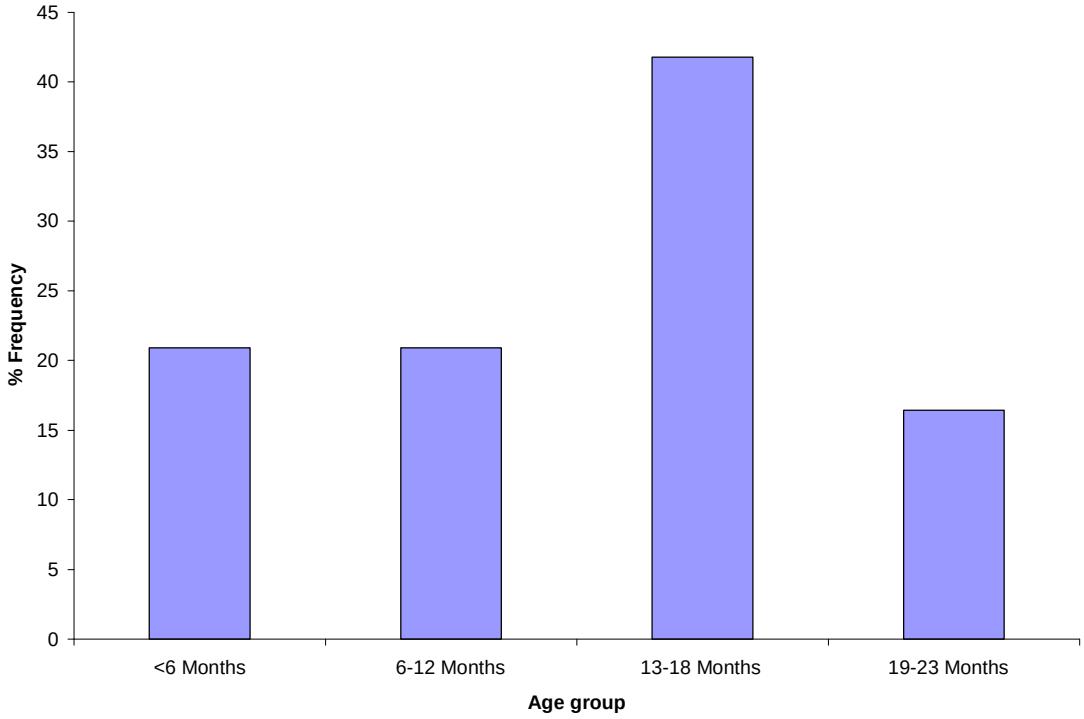
The timely complementary feeding rate indicator gives an overall measure of the degree to which women have complied with the recommendation that infants aged 6 - <10 months receive appropriate and adequate complementary foods in addition to breast milk. The complementary feeding indicator is intended as a basic, simple indicator of feeding patterns among children in the age group 6 - <10 months. By this age, it is recommended that infants should be receiving solid foods in addition to breast milk. “Solids” are defined as foods of mushy (semi-solid) or solid consistency such as porridge but does not include fluids such as fruit juice. The timely initiation in Ali Adde refugee camp was estimated at 77.8% (95% CI, 63.7-87.5) with the majority of the children fed on either thin porridge or Somali pancake (*lo’xox*). This is fairly good despite the lack of adequate food diversification.

6.6 Prevalence of Diarrhoea and Feeding Response

Introduction of food and liquids apart from breast milk to infant are done earlier than 6 months. Substances like water, sweetened water, and camel milk are the main food or drinks introduced before 6 months. These foods and especially the water are known to be unsafe and carry high risk of diarrhoea in children and infants. In the 14 days prior to the survey prevalence of diarrhoea was reported to be 25.9% (95% CI, 20.9-31.5). No case definition of diarrhoea was used and information provided here relied on what the mother thought was abnormal bowel movement in her child. It is important to note that an outbreak of diarrhoea was experienced in the camp and is thought to have started in mid February 2010. Since the survey was carried out 12 days after the situation in the camp had stabilised, the survey data might have therefore not reflected the diarrhoea morbidity due to the outbreak. Figure 13 shows a substantial number of children below six months

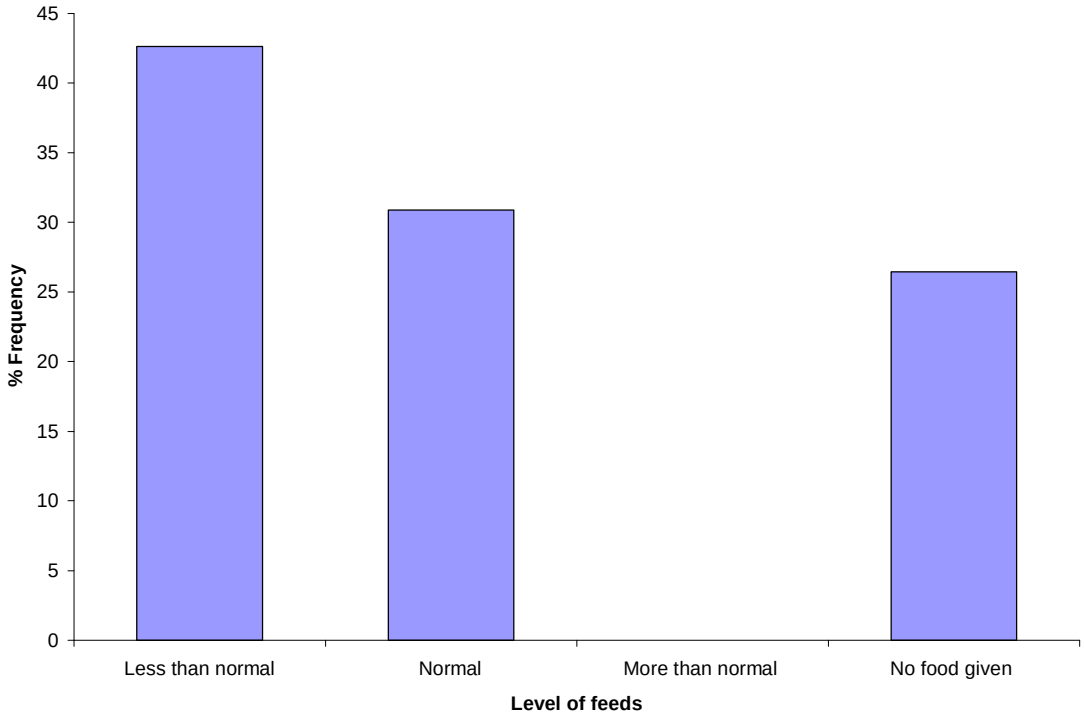
having diarrhoea with a sharp rise in the 13-18 months age group and a subsequent decline thereafter but the rates still remain high.

Figure 13 Trends in Diarrhoea prevalence with age



We did not evaluate the heath seeking behaviour but rather assessed the quality of home based management of diarrhoea. The percentage of children offered continued feeding during diarrhoeal episodes was assessed in children and infant less than 24 months. This indicator measures the change in frequency with which foods (breastfeeding and/or other foods) are offered during diarrhoea compared to when the child is healthy. About 73.5% (95% CI, 62.0-82.6) of children were offered continued feeding during diarrhoea however none of the children were offered increased feeding.

Figure 14 Levels of feeding infants during diarrhoea



Morbidity due to suspected fever and acute respiratory infections were 13.5% (95% CI, 9.9-18.2) and 49.4% (95% CI, 43.4-55.5) respectively. As the prevalence of malaria in the camp is negligible, the fever episodes were probably due to other infections rather than malaria. Nevertheless about half of the children sampled reported acute respiratory infection in the last 14 days before the survey. ARI was identified by the mother responding to the three signs of cough, rapid breathing and fever. ARI can be either viral or bacterial and is highly seasonal. This data was collected during the hot season and is similar to the prevalence of ARI found in the previous survey. This finding of high ARI is also in agreement with the hospital data. ARI is the leading cause of morbidity as shown above in the AMDA morbidity data.

6.7 Introduction of Different Foods by Age

The normal introduction of different foods to infants and children is summarized in the following three figures. In figure 15 it can be seen that a high number of children consumed breast milk with the proportions being highest in the lower age groups, as expected. Breast milk consumption then subsequently decreases with an increase in age

groups. Consumption of animal milk similarly increases with an increase in age group. In figure 16 it can be seen that water is introduced at a very early age and that the consumption of tea increases with increasing age. The introduction of water and other substance at early stage therefore affects the exclusive breast feeding indicator. The introduction of tea is a concern given the established role of tea in reducing iron absorption and increasing the risk of iron deficiency. In Figure 17 it can be seen that the introduction of complementary foods is high starting at 6 months of age. Mushy food like soaking Somali pan cake in tea is usually used to feed to children in addition to thin porridge made from CSB.

Figure 15 Milk Consumption in Infants and Young Children

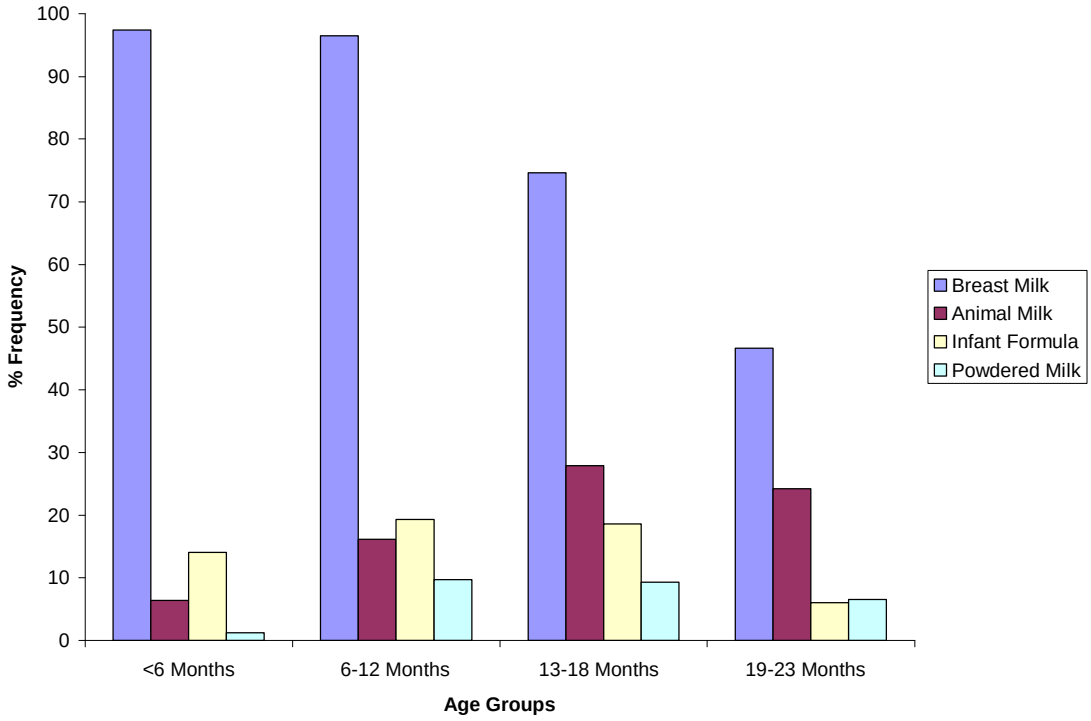


Figure 16 Consumption of Non-milk Fluids in Infants and Young Children

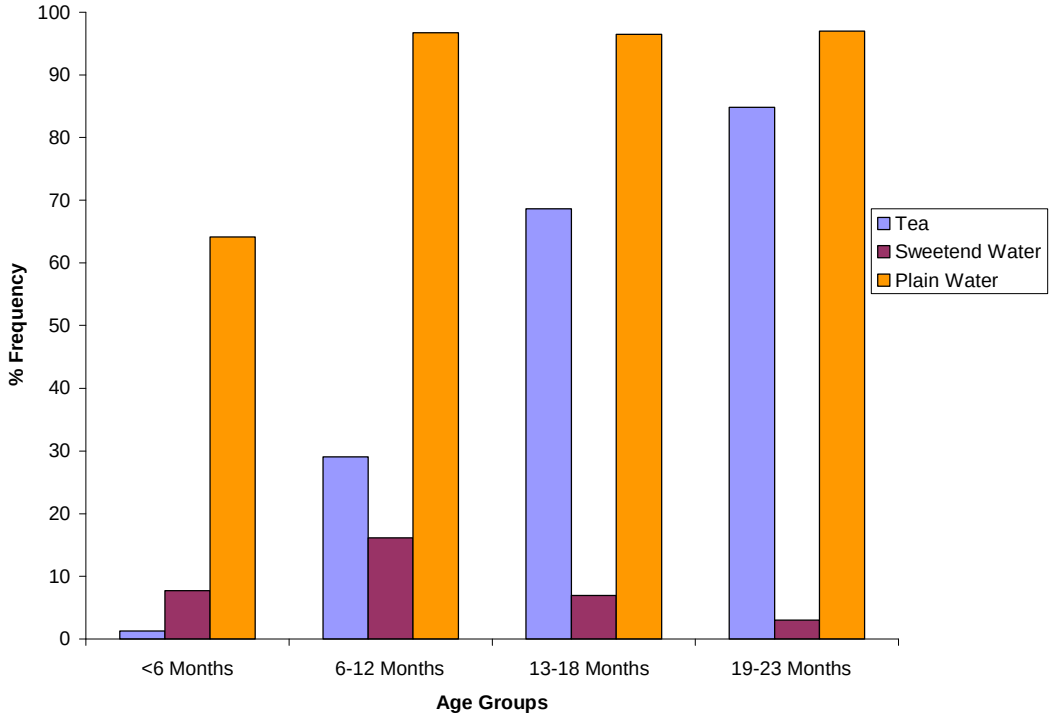
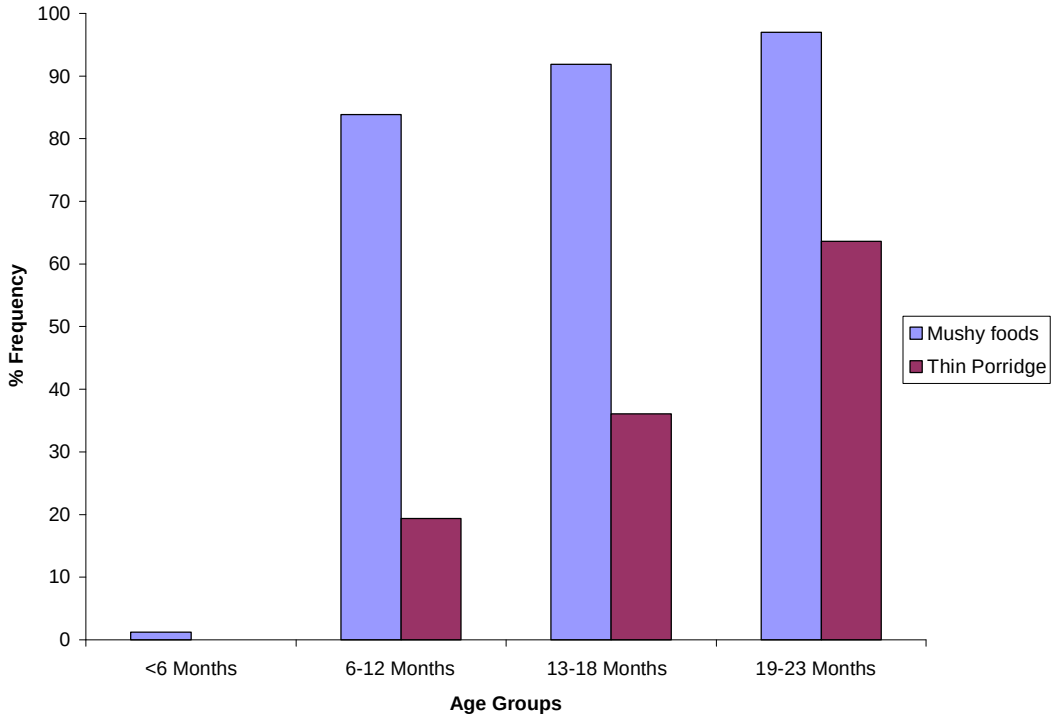


Figure 17 Consumption of Solid and Mushy Complementary Infant Foods



6.8 Vaccination coverage from cards 12-23 months

A vaccination/health card for children was possessed by 92.1% (n=127) of the children 6-59 months in the sample. Vaccination coverage was calculated for children aged 12-23 months. Vaccination coverage ranged from 90.6% for measles up to 97.4 % for BCG and DPT. Verbal reports of vaccination in the absence of a card were recorded but not included in the analysis. This was however negligible. The minimum coverage standards recommended for measles is 95%[30] and this indicate that more efforts will be required in order to meet this target in the camp.

Table 16 Vaccination coverage in 12-23 months from cards

Vaccination type	**N**	**Coverage % (95% CI)**
Epi Card	127	92.1 (86.1-95.7)
BCG	117	97.4 (92.7-99.1)
DPT	117	97.4 (92.9-99.3)
Measles	117	90.6 (84.0-94.7)

6.9 Household food consumption and food sources

6.9.1 Meal patterns for refugees and host population

As shown in the table below the mean frequency of consumption of meals was 2.74 and 2.68 for meals normally eaten and meals eaten the day before the survey respectively. Assessment of the daily meals eaten is done on the assumption that the recommended daily caloric intake requirements can only be met by eating three meals per day, which is used a proxy indicator of food security status of households. About 71.8% (95% CI, 67.6-75.7) of the households reported normally consuming three meals while 22.3% (95% CI, 18.8-26.3) reported consuming two meals. Households reporting consuming one meal per day accounted for 5.1% (95% CI, 3.4-7.4) of the households interviewed. According to the data, over 70% of the households were able to eat three meals a day, however there is still a third of the population that consumed two meals or less which indicates substantial food insecurity situation in the refugee camp.

[30] Minimum Standards in Health Care' The Sphere Project (2000)

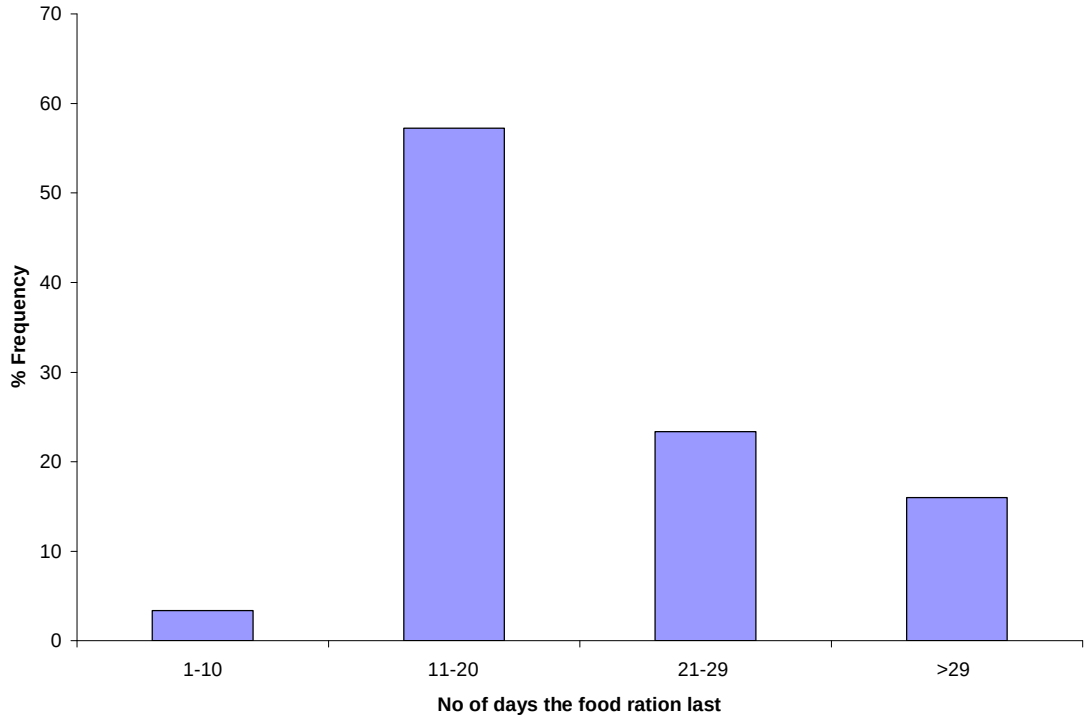
Table 17 Mean number of meals normally eaten and that eaten the day preceding the survey.

Questions	N	Mean±SD
Meals family Normally eat	475	2.74± 0.51
Meals family ate yesterday	475	2.68±0.58

6.9.2 Duration the food ration lasts

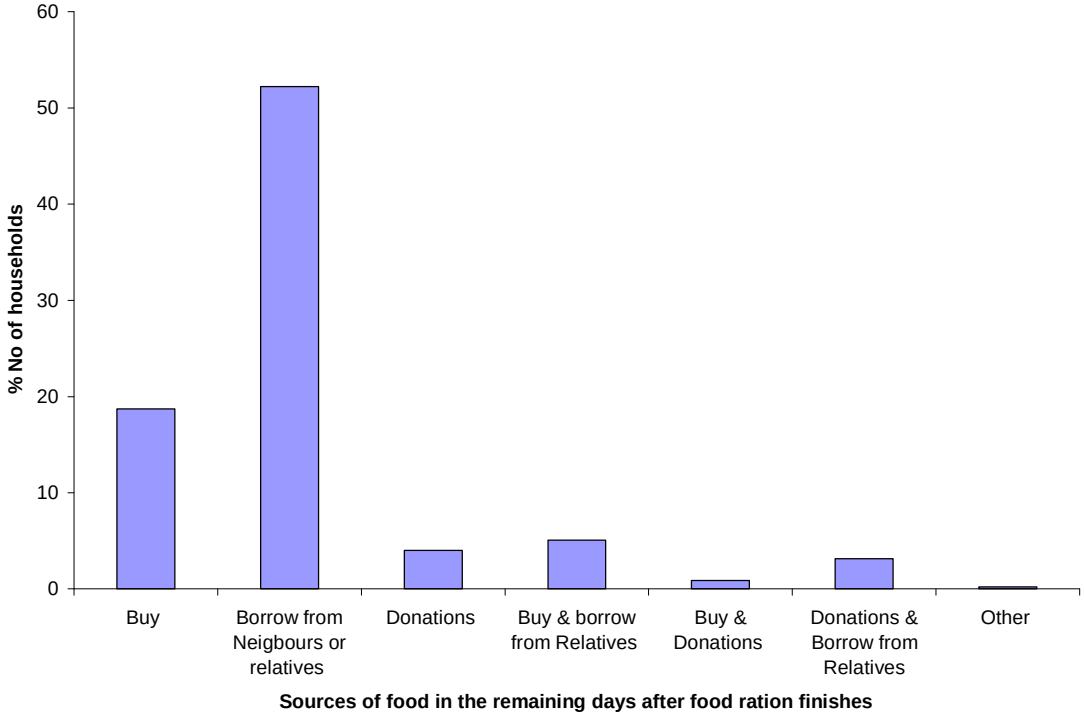
The mean number of days the food ration lasts was estimated at 20.1 days (SD 5.9) with about 84% of the households reporting that the food ration does not last for the intended 30 days while only 16.0% said the food ration given is enough for the intended number of days. The figure below shows the pattern of responses on the duration the food ration lasts. From this figure it is evident that the majority of the refugees report the food ration lasting for less than the intended number of days.

Figure 18 Frequency of duration the food ration lasts



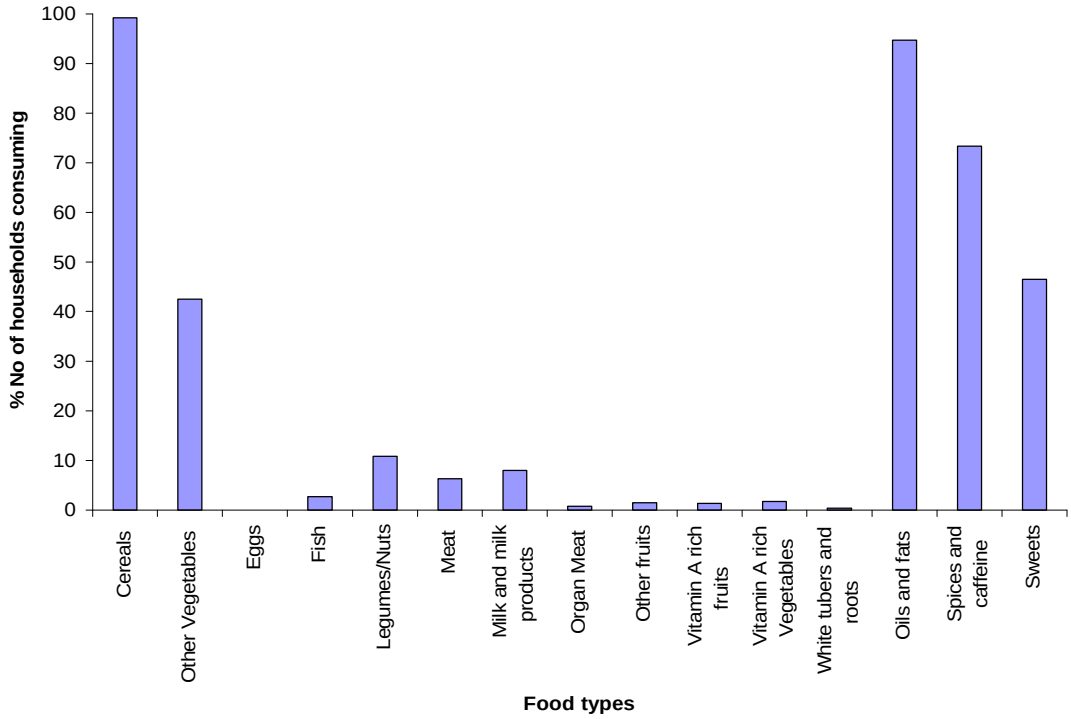
Over half of the respondents said they borrow food from relatives or neighbours when the food ration finishes before the next distribution. This accounted for 52.2% of the respondents. On the other hand about 18.7% said they buy the food after the food ration finishes while smaller proportions practiced mixed forms of coping strategies including either buying and borrowing from relatives, and multiples responses of donation and borrow from relatives etc. It is interesting to note that about 42.3% (95% CI, 38.0-46.8) of the population reported not selling the ration while a higher proportion of 57.7% (95% CI, 53.2-62.1) said they sold the ration to buy a variety of other food items like spaghetti, rice, meat, sugar, vegetables as well as other non food items. It is also important to note that some of the households have adapted some coping mechanisms with the long serving refugees having their children mainly girls providing cheap labour in houses in the major town in Djibouti. This therefore provides some level of income although small. Similarly small scale income generating projects that are currently funded by LWF could also contribute to improving the purchasing power and food diversity.

Figure 19 Coping mechanism of households



As shown in the figure below a high number of households in the refugee camp consume cereals, oils and tea. There are limited sources of Vitamin A rich food and other micronutrients. Although a substantial number of households consume beans and other lentils, the inhibitory effect of tea on iron absorption cannot be ignored.

Figure 20 Dietary diversity score



6.11 Food Distribution Analysis

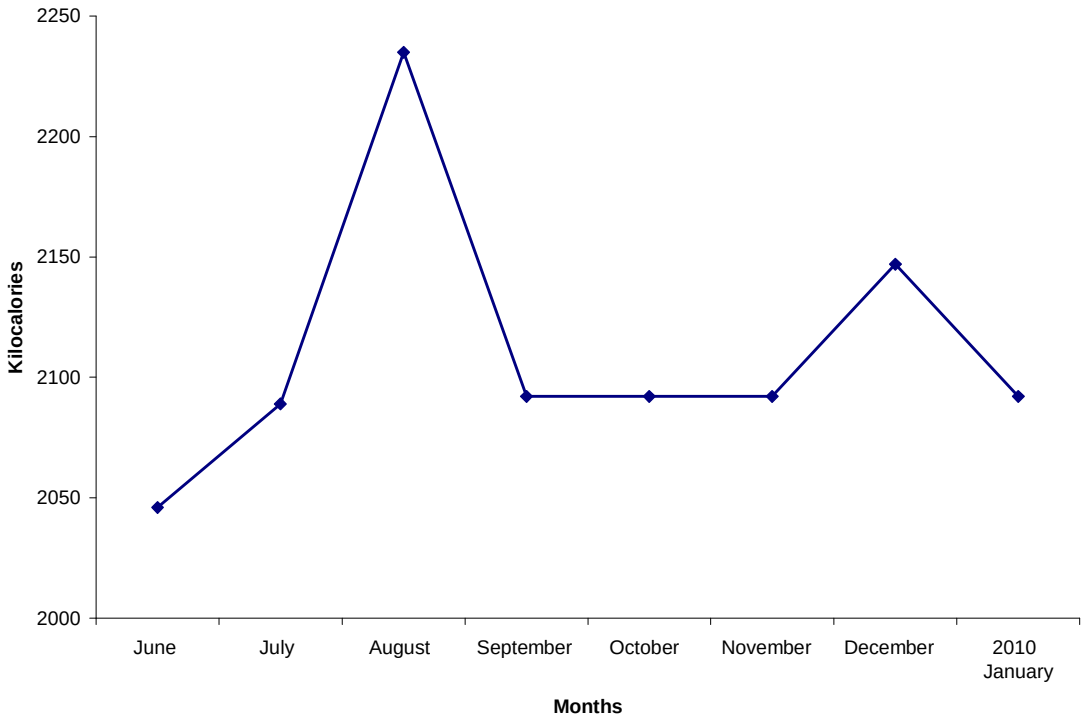
There has been no major change in the food distribution from the previous survey in terms of the available kilocalories. However there has been some positive improvement in the type of food distributed. First, UNHCR has started complementing the general food ration basket with canned fish and beans although the pattern of this complement is not systematic. It is believed that about 4-5 distributions with these supplements have been done in the last year. Secondly, following on our previous recommendations from last year's survey, the refugees are now provided with wheat flour throughout the year which does not alternate with rice as was the case previously. This was important because wheat flour mixed with CSB is used to make Somali pan cake that can also be eaten by children and also eaten in the three meals as opposed to rice. Food distribution records available

for the last six months show the daily kilocalories range from 2046 to 2235 as shown in figure 20 below. The following food items are distributed to the refugees on a monthly basis.

Table 18 Quantities and food items distributed in the camp.

Food item	Amount per month per person in grams	Amount per day per person in
CSB: USAID.	1500	50
White beans (haricot beans)	1800	60
Iodized salt	150	5
Sugar	600	20
Oil (fortified with Vit A/D	750	25
Wheat flour	12000	400

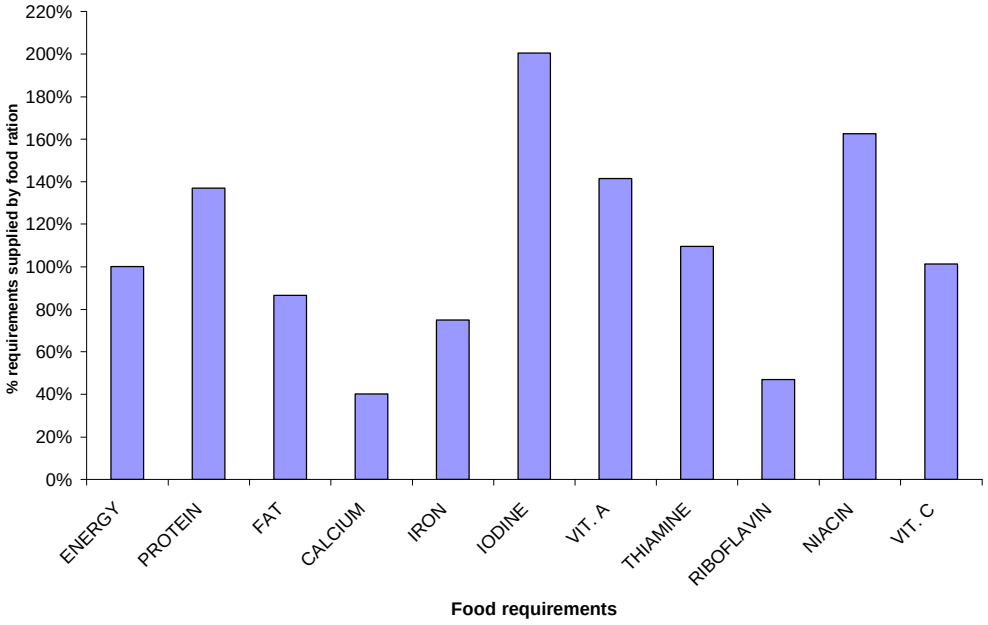
Figure 21 Daily kilocalories in Food distribution in the last six months



Using NutVal, a spreadsheet application developed by UNHCR, WFP and UCL, the nutrient content of the distributed ration was analysed for macro- and micro- nutrient content. The graphs below indicate the levels of energy and nutrients supplied in the

month of the survey. It can be seen that the energy content of the ration is about 100% of the 2100 Kcal minimum requirement. The protein and fat contents are fairly adequate as well. There was adequate levels of vitamin A, thiamine, vitamin C and niacin, but the levels of iron, calcium and riboflavin were lower than the daily requirements. Iodine requirement was also double the safe levels. It is worth noting that both over supplementation and under supplementation of iodine has adverse health effects.

Figure 22 Macro and Micronutrients provided in the food ration



It is important however to note that while the food quantity could be sufficient theoretically, continued supervision of the distribution is important. Currently UNHCR and WFP monitor the food distribution in the camp, however it is important to make verification of food distribution by on-site distribution monitoring using accepted random weighing procedures. This recommendation was similarly made in the previous survey, however actions taken are unsatisfactory. Similarly the food distribution in the warehouse needs to follow first in first out (FIFO) such that food can be distributed before it expires in the warehouse. Although no expired food was seen during the visit, many of the women groups met during the survey showed samples of wheat flour with a lot of weevils which is an indication of either poor storage or long time storage.

6.12 Retrospective mortality data

During the survey, a total of 3006 people were found in the assessed households. Among them 673 children were below the age of five years. Over the 119 days preceding the survey a total of nine deaths was reported with seven adults and two children under five years. The following mortality rates were obtained

Crude death rate = 0.25/10,000 (95% CI, 0.11-0.60)

Under five death rate = 0.26/10,000 (95% CI, 0.06-1.09)

From this data, the rates of both crude mortality and under five mortality are within acceptable limits[31]. Sourcing information on mortality was the most difficult aspect of the survey as the teams had to explain in detail the purpose of this question and ensure the household that their ration card number will not be affected. Similarly by using the community health workers in the survey and by sending them to their respective sections made it easier to verify the information by the household especially on mortality data.

6.13 Factors associated with Malnutrition and Anaemia

Outbreak of diarrhoea

The outbreak of diarrhoea (February 2010) is thought to have increased the prevalence of acute malnutrition. There was a significant difference in mean weight of children reported to have had diarrhoea and those without diarrhoea in the two weeks preceding the survey (P=0.001). This therefore subsequently affects the WHZ scores shifting the z-scores towards the negative. Short period diarrhoea does not affect the HAZ z-scores which measures stunting and it is with this argument although not significant that we see a reduction in 4.5 % in the prevalence of stunting from 38.3% to 33.8% (P= 0.339) with prevalence of severe stunting reducing by 5.4% (p= 0.115) from 17.2% to 11.8%. It is in this view coupled with the reduced anaemia prevalence in the both women and children that that we deduce the general nutritional status of the camp was probably better before

[31] Nutrition Working Group. 2006. Nutrition Assessment Guidelines: recommendations for Somalia

the outbreak of the diarrhoea. It is anticipated that a much higher prevalence of both this indicators would have been experienced if the nutrition program in the camp has not improved from the last survey. On the other hand if the nutritional status of the children would have been poor then we would have experienced a higher prevalence of severe that would have possibly progressed from moderate to severe.

Similarly apart from the outbreak of diarrhoea, ARI is also a major cause of child morbidity. These findings also reveal poor health situation and high morbidity among children in the camp. The high rate of morbidity therefore negatively impacts on the nutritional status of children. The assumed high prevalence of intestinal parasites may also contribute greatly to the overall prevalence of malnutrition as well as anaemia.

Poor feeding during diarrhoea

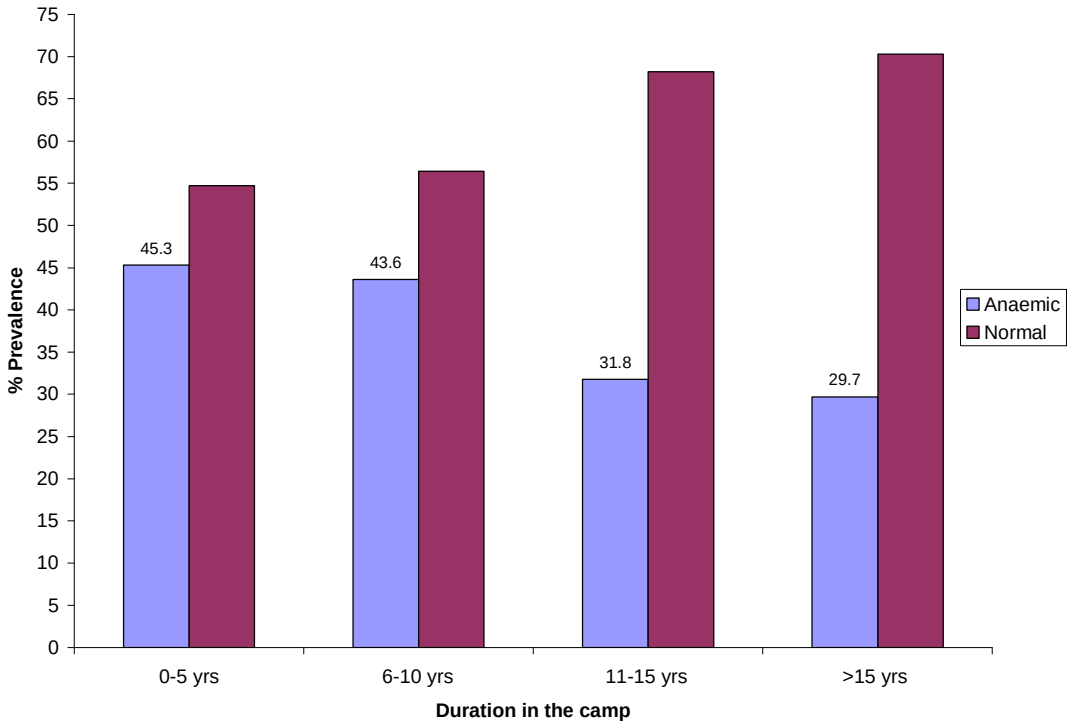
The home management of diarrhoea and feeding during diarrhoea was generally poor in the camp. It is important to note that that 26.5% of infants/children suffering from diarrhoea had their feeding withdrawn. Withdrawal of feeding during diarrhoea can reduce the chances of full recovery and is an important risk factor for developing both moderate and severe malnutrition especially during the time of the outbreak when a higher number of children were affected. This therefore might have been the main contributing factor to the high GAM prevalence found in the survey.

Duration in the camp

The duration in the camp was found to be negatively associated with the prevalence of anaemia in women. This is shown in the figure below as can be seen anaemia prevalence decreases with increasing duration of stay in the camp. This is thought to be related to poor cooping mechanisms in the early years of their stay as well as the time taken before the family is fully registered to get food and other non food services in the camp. As earlier discussed with poor sources of income in the camp, a large number of the refugees depend on buying and borrowing from relatives and neighbours to cover the short fall for food items. This therefore requires time to learn your neighbours as well as time to set up income generating business or employment before you can confidently rely on them or

get money to buy other food items respectively. A number of refugees who were not registered were seen during the survey and it is logically reasonable to imagine how tough it might be for this people to cope and survive during this time.

Figure 23 Anaemia prevalence in relation to duration of stay in the camp for Women



Lack of livelihood diversification

Lack of adequate coping strategies also affects the populations at this time of economic crisis. The majority of the refugees are entirely food aid dependent and livelihood diversification and coping mechanism are limited. However with the coming of LWF there has been substantial improvement in this area with groups of people engaged in income generating activities. The number of shops, kiosks and groceries operated by the refugees as a source of income generation have substantially increased. This therefore contributes to the purchasing power of the refugees which subsequently results in food diversification and hence improves anaemia and nutritional status of the camp population. It is however important to expand this sector to involve a larger proportions of the refugees.

Improved dietary intake.

The provision of wheat flour in the food basket can make a lot of difference. Wheat flour mixed with a little of CSB is commonly used in the camp to make Somali pan cakes that can also be eaten by children and eaten in three meals in a day. This is therefore thought to transfer some essential micronutrients to the family.

Child age

Child age is also a risk factor for both the prevalence of malnutrition as well as anaemia. Higher prevalences of malnutrition as well as anaemia were found in children under the age of two years. This is thought to be related to the poor feeding practices in the camp. Apart from the lack of poor exclusive breastfeeding, there also seems to be limited choices for alternative foods for this age group. It is assumed that the older age groups of children share the available foods at the household.

Consumption of tea

The consumption of tea has been associated with reduced absorption of iron that is important in the formation of haemoglobin. The high rate of tea consumption among children and women may also contribute to the high rate of anaemia in this population. The majority of the refugees consume tea either with food or immediately after food. The Somali pancake is soaked in tea before it is are served to children. The limited iron availability in the food ration coupled with the inhibitory effect of tea may therefore greatly contribute to the high prevalence of anaemia. It is however important to note that there was evidence of awareness within the community over the tea issue where women were instructed to either take tea after some time before or after meals. The tea issue was part of an awareness campaign lodged in the camp after the last survey. However some women still argue that there was no alternative to the tea because the tea was used to soften the pancakes for the children.

Improved Nutrition program

The nutrition program at the health facility has been greatly improved in terms of infrastructure as well as staff capacity. Clear admission guidelines are available both at

the therapeutic facility as well as the supplementary feeding centre. The nutrition program has been divided into two main sections which are the therapeutic and supplementary centres with the therapeutic divided into stabilisation centre and out patient therapeutic centres.

The treatment of SAM in the camp dispensary was established as clinical therapeutic care program through the provisions of medical care, F75 and F100 milk. This program was changed to community based therapeutic care program (CTC) since August 2009 through technical support provided by the UNHCR nutrition consultant. The new approach provides assistances to severely malnourished children through clinical based treatment in the stabilization centre and home based treatment through out-patient therapeutic care program.

The preventive part of supplementary feeding program targets children discharged from outpatient therapeutic care program, pregnant and lactating women. Children discharged from OTP receive take home dry mix supplementary food (CSB, Sugar and Oil) at the rate of 8.3kg/person/month for an average of two months to prevent the relapse of malnutrition. A similar product is given to pregnant and breast feeding women on a blanket basis, to prevent malnutrition, and support fetal growth and breast feeding. Pregnant women are targeted from the time when pregnancy is detected (first trimesters) to the time of delivery. Lactating women are targeted from the time of delivery to six months post-partum. The preventive program coverage and time of stay in the program is therefore very high compared with the curative activities.

Complementary feeding program

Based on the findings of the previous survey which found high levels of malnutrition and anaemia in children under 24 months of age, a complementary feeding program was established. UNHCR supported the supply of complementary food through the provision of lipid-based nutrient supplement (LNS) UNHCR procured 1.8 Metric tones of LNS from Nutriset Company which was delivered to AMDA in November 2009. The new initiative was started in November 2009 through conducting an acceptability study by

distributing the product (Nutributter®) to a sample of households with children under 24 months and interviewing caregivers, section leaders, health personnel and various community groups. After the study showed high acceptability of the product, AMDA started a blanket distribution to children of the ages 6 to 24 months in the camp in January 2010. Targeting excludes only severely malnourished children as this group is receiving therapeutic care through the provisions products including Plumpynut and therapeutic milks. Discharge from the LNS program is the age limit, Children reaching 24 months of age are discharged from the LNSprogram.

It is important to note that there are about 100 cartons of LNS still in the UNHCR office in Ali Sabieh which is expiring in June 2010. It will be important to make use of this stock before they expire. Donating the stock to the ministry of health or any other organisation working on this sector will help utilise the stock . The short shelf life period is a major impediment in the use of the LNS in remote settings.

Nutrition awareness education

Nutrition education awareness activities are provided to the community in the camp dispensary, during feeding program or supplementary food distribution dates by Nutritional volunteers. The CHW are conducting the nutrition education programs by mobilizing the community, identifying and referring suspected cases of malnutrition to the nutrition program, providing periodical awareness education and conducting hygiene and sanitation campaign in their designated sections.

UNHCR participated in the capacity building of the community health workers. It is however important to note the implementation of this program has been erratic and slow. The nutritional promoters who were expected to provide support to the community nutrition activities are congested in the camp dispensary and occupied in routine food distribution and HIS activities.

Poor health infrastructure

There is some improvement in the delivery of health care in the camp as compared to the previous survey. However there is a need to further improve staffing, as well as availability of drugs and reporting and recording systems. The lack of functional antenatal care and infant growth monitoring systems similarly contributes to the low performance of the health facility. Recruiting a nutritionist working with AMDA would improve and facilitate better liaison with UNHCR Nutritionist and subsequently improve service delivery.

Poor water and sanitation facilities

The water and sanitation situation in the camp is still serious and need urgent actions. The recent diarrhea outbreak was thought to be due to poor sanitation facilities and use of non potable water for drinking and domestic use. The piped water provided to the sections on alternate days is inadequate in quantity and hard to obtain.

7.0 Discussion

The nutritional survey undertaken in Ali Adde refugee camp sampled a higher number of children as compared to the previous survey. This is done in order to enable monitor change in the subsequent surveys due to the current intervention of LNS in complementary feeding of children below 2 years. The current survey sampled a total number of 585 children aged 6-59 months and the analysis of the data showed a GAM of 16.5% and severe malnutrition of 3.1% . This finding shows a high/serious malnutrition rate according to WHO classification for interpreting weight-for-height

There are several factors thought to have contributed to the high malnutrition rate especially of the increased GAM. As discussed earlier there was an outbreak of diarrhoea in the camp that started in early February but had its peak days before the start of the survey. It is therefore important to note that with the high GAM and reduced SAM, the recent diarrhoea might have had an effect on the WHZ scores. Diarrhoea is a major factor that can lead to weight loss. And the lack of higher cases of SAM indicates well nourished children before the diarrhoea.

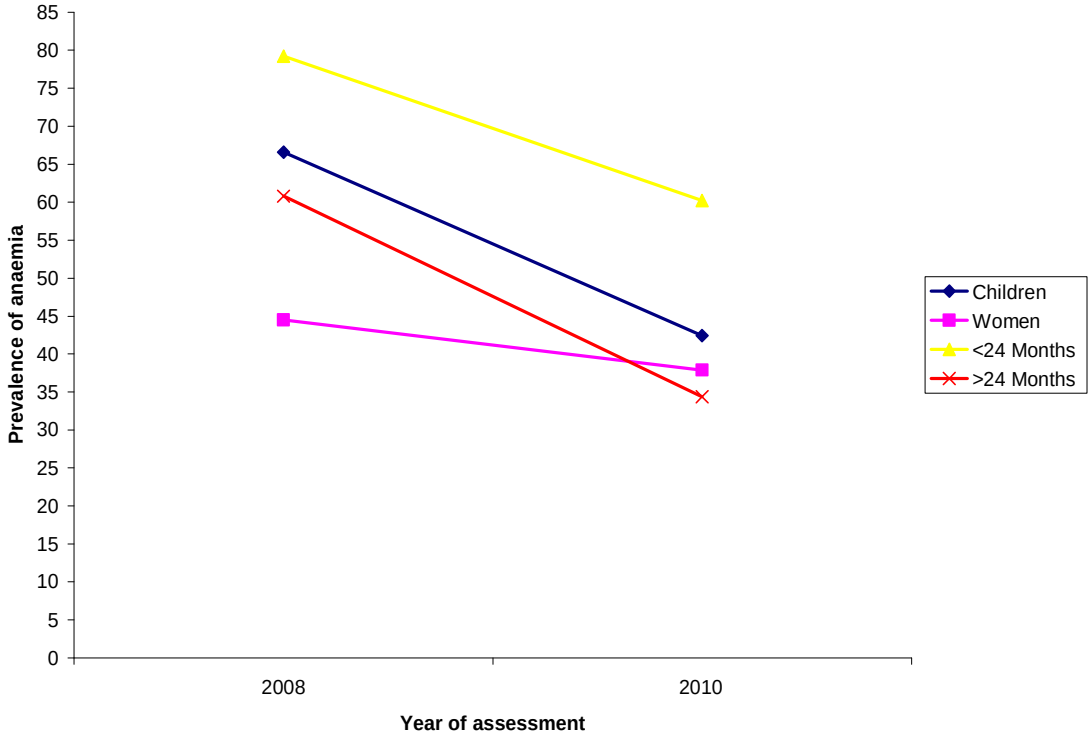
Another important issue that was raised by the nutrition department as shown above is the resource dilution for both supplementary and therapeutic feeding programs . The amount of food and supplements received from WFP was much less that the expected number of cases in the refugee camp. This therefore lead to the prioritization of cases with the highly malnourished children given priority and also increasing the time taken to discharge children from the program. This similarly could result to high number of moderate malnutrition without necessarily increasing the severe malnutrition.

Finally, there was improvement of the some of the survey equipments used in the previous survey. In this survey a digital scale was used to weigh the children as opposed to the hanging scale used in the previous survey. Possible errors in the hanging scale measurement by few hundred grams could not be ruled out. Hence with the improved weight measurement then there is a likelihood of a more accurate measurement of the WHZ. It is important to note that the WFA that did not involve any change in equipments

is very similar to the finding in the last survey and especially for the severe cases that still stand at 17% in both surveys. On the other hand the sample size has almost been doubled in this survey and hence a higher precision and close representativeness to the actual situation.

The reduction in the prevalence of anaemia in both children and women was remarkable, especially in children. There change in women anaemia prevalence was statistically not significant, however a high levels of change was observed in children 6-59 months. Both the under 24 months and over 24 months showed significant change in the prevalence of anaemia with the over 24 months reducing the prevalence by almost half as shown in the graph below.

Figure 24 Comparison of Anaemia prevalence between 2008 and 2010



As stated in the factors responsible for the anaemia prevalence, several issues were related to this remarkable improvement. The improvement of the nutrition program, active case finding, complementary feeding among others are thought to contribute to the in improvement in the reduction of the prevalence of anaemia. The continuous provision of wheat flour coupled with the time to time food ration supplementation are also important issues that improve the micronutrient nutrition of the population. Food security situation appear to be improved with assumed improved purchasing power of the refugees. The presence of high number of business premises like shops, hotel, and groceries are important indication towards the improvement found in the camp.

The general nutrition program setting has experienced an overhaul changes which subsequently improved the service delivery. Staff working in nutrition look more motivated that ever before and similarly there are good feedback from the community on the improvement of the nutrition program.

A pilot initiative of multi-storey gardening started in the camp by the UNHCR field staff through the technical assistance of the UNHCR Nutritionist. The pilot activity investigates types of vegetables suitable to the local context, identification of diseases and pests and possible prevention methods. After the pilot activities finalized, UNHCR with the help of project implementing partners will promote the activities to the community. The ultimate purpose of vegetable gardening is to create access to vitamins and minerals, prevent sells of general rations for the purchases of vegetables and also create income option and economic activities to the families.

It is however important to note that the general infant feeding practices, water and sanitation programs are still poor. The availability of portable water together with good sanitation are important for the upward progress of the nutritional status of the refugee camp. It is important that all the attention are focused on the improvement of the availability of safe water and good sanitation.

Generally the nutritional and food security situation of the refugee camp is delicate and there is need for UNHCR continued monitoring of both the nutrition as well as the food security aspects.

8.0 Recommendations

Income generating activities

- The coming of Lutheran World foundation greatly improved access to short loans for income generating in the refugee camps as well as school enrolment. This can be realised from the number of shops, kiosk, goat rearing and vegetable selling ventures, there is however need to further expand the credit access facility to larger target groups. UNHCR and LWF are recommended to work closely availing revolving fund and technical assistances to refugees for the next 24 months, which presumably improves self reliance activities and improves camp food security situation.
- There is need to provide professional support to these income generating groups so as to maximise profit and gain knowledge on the best care to the area of their interest. A group recently lost all the goats they purchased from the income generating credit after applying a deadly insecticide to the animals so as to control ticks.

Health and Nutrition

- There is need for AMDA and UNHCR to work together to strengthen the public health program in terms of improving on human resources, expertise and program management.
- The establishment of a Medical Coordinator position to oversee the field activities and for better understanding on the health issues at the camp will be ideal. It is also recommended that the ANC and other preventative activities at PHC level are reviewed by UNHCR and AMDA and strengthened as appropriate.
- An immediate establishment of child growth monitoring program by AMDA in the camp dispensary is paramount. It is recommended that UNHCR provides technical assistances and avail funding for human and logistical requirements.
- UNHCR, WFP and AMDA in coordination with health and nutrition partners (UNICEF and Ministry of Health) should work together and supply therapeutic and supplementary products on timely fashion addressing actual needs in the camp.

- It is recommended that UNHCR rolls out and establishes more demonstrations on multi storey garden to all sections before finally being rolled out to all households.
- The impact of the nutrition consultant in terms of improving nutrition program setting, mass screening of children, active case finding among others is evident. The presence of UNHCR nutrition technical person at country level at all times to attend to nutrition related issues in the camp is very important.
- It is recommended that AMDA with the support of UNHCR recruits a qualified nutritionist or nurse experienced in nutrition to oversee and lead the nutrition activities in the camp.

Water and sanitation

- It is of utmost important that urgent measures be taken by UNHCR and partners to address water and sanitation problems in the camp. Failure to do so may cause more outbreaks in the camp which will subsequently increase malnutrition prevalence due to poor home management of diarrhoea as seen in the results .
- It is recommended to separate the sanitation into the public health aspects and the construction part. AMDA should stick to the public health aspect and UNHCR to look for other project implementing partner specialized in Water, Sanitation and hygiene (WASH) activities to take over construction activities from AMDA.
- There is a need to think of long term period when constructing the toilets and the availability of communal toilets in sections will help new arrivals. Currently the toilets dug by the refugees are about one metre square which fills up within a short time. So a much deeper toilets will be useful for long time use.
- There is an urgent need to increase the number of toilets in the camp, especially in over populated sections. At least attainment of a toilet for every two household would be sufficient. A long term stay should be anticipated when constructing the toilets. Currently all the toilets visited are almost full to the brim, which is due to the initial small depth dug.
- Improvement of the shallow wells on the river bed is also important. The shallow wells should be covered and appropriate hand pump fixed. There is

individual ownership of the wells and care needs to be taken when and if this is to be undertaken.

- There is need to provide more distribution water points and especially in the large sections such as sections 5 and 8 which require extra more distribution points in order to reduce the saturation of population from this section through expansion of new site.
- The treated water supplied to the camp is intermittent and provides an inadequate water quantity for use in the household. This therefore forces the refugees to gather other sources of water that might not be portable. The quantity of the treated water also needs to be increased so that at least the minimum UNHCR recommended amount of water per day per person can be achieved (20 lts /per day/per person).

Heath Education

- Knowledge and attitudes of the refugees also play a key role in the nutritional status of their children. The need to continue and strengthen health education campaigns is paramount. A timetables health education programs on nutrition and in the local language need to be developed.
- An IEC campaign on maternal nutrition including iron/folate supplementation should be introduced. Other issues such as infant feeding and prevention of infections should also be addressed.

School Program

- The urgent handing over of the newly constructed toilet in the school to the school management is recommended to ease and alleviate the current poor sanitary situation in the school.

- The implementation of a feeding program in school will not only improve child enrolment and attendance but will also improve child nutrition. It is therefore recommended to establish a school feeding program composed of a balanced meal provided for lunch.

Implementing integrated anaemia control and prevention strategy

In order to reduce the prevalence of anaemia in the refugee camp there is need to implement a program for anaemia control that involves:

- Dietary improvement through education to encourage selection of iron-rich foods to improve iron content and bioavailability.
- The role out of the multi story gardens to sections and households and proper monitoring and offering advice will be helpful to improve the access to micronutrient rich foods.
- To educate on the impact of tea on the absorption of iron
- Iron supplementation and de-worming. Implementing de-worming programs for all children above 2 years and also introduce de-worming program at the ANC
- Linking intervention strategies to related health and nutrition programs

Food aid monitoring

- It is recommended that UNHCR and WFP implement a regular monitoring of food aid distribution and post-food aid distribution.

Monitoring of the health and nutrition situation in the camp

- Ali Adde refugee camp is a delicate emergency situation both for nutrition as well general food security. The need to have continued UNHCR staff to support AMDA and monitor the general nutrition and food security situation is important. Frequent review meetings with all the agencies concerned in the refugee camp will be necessary in order to follow progress and detect areas of deterioration much faster.

Repetition of the survey

It will be important to review the progress of the nutritional and anaemia program after the intervention programs are instituted.

9.0 Annex

Annex1 Population based sampling

Geographical unit	Population size (under five)	Clusters	Team
Sec1 qu 1		1	**1**
Sec1 qu 1	103	2	**1**
Sec 1 qu 2	60	3	**2**
Sec 1 qu 3	55	4	**2**
Sec 2 qu1	54	5	**3**
Sec2 qu 2	85	6	**3**
Sec 3 qu1		7	**4**
Sec 3 qu1	93	8	**4**
Sec 3 qu 2	81	9	**3**
Sec 4 qu 1		10	**1**
Sec 4 qu 1	76	11	**1**
Sec 4 qu 2	79	12	**2**
Sec 4 qu 3	63	13	**2**
Sec.5 Qu.1	62	14	**3**
Sec.5 Qu.2		15	**3**
Sec.5 Qu.2		16	**3**
Sec.5 Qu.2		17	**4**
Sec.5 Qu.2	243	18	**4**
Sec. 6 Qu.1		19	**1**
Sec. 6 Qu.1	70	20	**1**
Sec. 6 Qu.2	67	21	**2**
Sec. 7 Qu.1	29	Pilot test	
Sec. 7 Qu.2	46	22	**3**
Sec.8 Qu.1		23	**2**
Sec.8 Qu.1	138	24	**2**
Sec.8 Qu.2	61	25	**3**
Sec.8 Qu.3		26	**4**
Sec.8 Qu.3		27	**4**
Sec.8 Qu.3	173	28	**4**
Sec.8 Qu.4		29	**1**
Sec.8 Qu.4	105	30	**1**

Annex 2 Survey Calendar

Day	Date	Activity
Wednesday	10th March	Arrival in Djibouti
Thursday	11th March	Questionaire Design and Meeting AMDA and UNHCR
Friday	12th March	Questionaire finalisation
Saturday	13th March	Translation of questionaires
Sunday	14th March	Development of Somalia version of questionaire and travel to Ali Sabieh
Monday	15th March	Visiting camp and meeting AMDA staff, section leaders and arrange for training venue and refreshment
Tuesday	16th March	Training postponed due to diarrhoea, Emergency meeting with key organisation in the camp and development of diarhoea investigation tool
Wednesday	17th March	Diarhoea oubreak assessment and prevention campaigns, interviews with patients
Thursday	18th March	Water treatment trainings and community mobilisation, interviews with patients
Friday	19th March	Water treatment trainings and community mobilisation, interviews with patients
Saturday	20th March	Diarhoea report write up and community visit
Sunday	21st March	Diarhoea report write up and community visit and preparation for nutritional survey venue
Monday	22nd March	Nutrition training
Tuesday	23rd March	Nutrition training
Wednesday	24th March	Nutrition training
Thursday	25th March	Pilot Survey
Friday	26th March	Survey
Saturday	27th March	Survey and data entry
Sunday	28th March	Survey
Monday	29th March	Survey and data entry and data cleaning on the previous entry

Tuesday	30th March	Survey and data entry and data cleaning on the previous entry
Wednesday	31st March	Survey and data entry and data cleaning on the previous entry
Thursday	1st April	Survey and data entry and data cleaning on the previous entry
Friday	2nd April	Survey and staff feedback meeting and travel to Djibouti
Saturday	3rd April	Data entry in progress, analysis of AMDA monthly HIS data
Sunday	4th April	Literature review for report writing and Data entry continues
Monday	5th April	Literature review for report writing and Data entry continues
Tuesday	6th April	Data Analysis
Wednesday	7th April	Data Analysis
Thursday	8th April	Data Analysis
Friday	9th April	Data Analysis
Saturday	10th April	Report Writing
Sunday	11th April	Report Writing
Monday	12th April	Report Writing
Tuesday	13th April	Report Writing
Wednesday	14th April	Circulation of report for Comments
Thursday	15th April	Final Report
Friday	16th April	Travel to Nairobi
Sat- Monday	17-19th April	Finalise Report

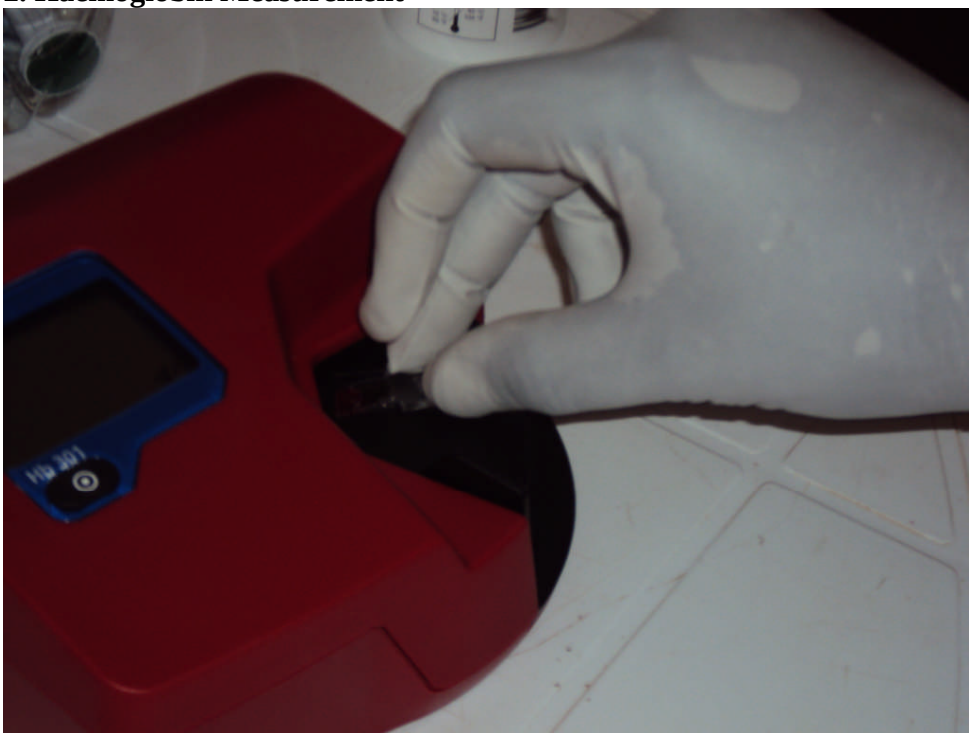
Annex 3 Anthropometric results of children (based on WHO standards 2005)

	All n = 574	**Boys** n = 277	**Girls** n = 297
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(97) 16.9 % (12.9 - 21.9 95% C.I.)	(53) 19.1 % (14.7 - 24.5 95% C.I.)	(44) 14.8 % (9.9 - 21.5 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(62) 10.8 % (8.0 - 14.5 95% C.I.)	(34) 12.3 % (8.6 - 17.3 95% C.I.)	(28) 9.4 % (6.2 - 14.1 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(35) 6.1 % (4.0 - 9.2 95% C.I.)	(19) 6.9 % (4.1 - 11.2 95% C.I.)	(16) 5.4 % (2.9 - 9.8 95% C.I.)

Annex 4 Survey pictures

1. Training of Height Measurement

2. Haemoglobin Measurement



3. Survey supplies preparation

4. Household interview

5. Multi storey garden

6 Water scarcity