UNHCR COUNTRY OFFICE YEMEN

Anthropometric, retrospective mortality and hemoglobin measurement survey

UNHCR in Collaboration with MoH, UNICEF, IDF and CSSW Yemen

June 2009

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On mission

Executive summary

Yemen has traditionally adopted an open door policy to Somalis, granting them *prima facie* refugee status while other nationalities go through the refugee status determination (RSD) process. Majority of the refugees in Yemen stay in the urban while about 11,500 refugees stay in Kharaz camp.

The survey investigated elements of the child survival program in the refugee communities; it worked into estimating the prevalence of global acute malnutrition of the refugees and some host communities living together with refugees. Anthropometric indices were used to define the prevalence of malnutrition; weight-for-height (wasting or thinness), height-for-age (stunting or chronic malnutrition) and weight-for-age (underweight). Cluster sampling was used; 30 clusters were established in each survey location where 30 children were sampled. The target study population was children aged 6.0 to 59.0 months with 65.0 to 110.0 cm height.

Other variables studied in this survey included, infant and young child feeding, morbidity for fever, diarrhea and acute respiratory infection, immunization program for BCG, OPV, pentavalent and measles, vitamin A supplementation coverage and retrospective mortality. In the Sana'a survey haemoglobin measurement was added to establish the levels of anaemia prevalence among under 5 year's children and women at reproductive age.

2892 children below 5 years were assessed; the sex ration indicated that boys and girls were equally represented where by it was boys 1: girls 1. The global acute malnutrition was 7.2% in Kharaz camp, 9.9% villages surrounding Kharaz camp, 9.2% in Basateen and 10.9% Sana'a. The underweight malnutrition was 19.7% Kharaz camp, 27.0% villages surrounding Kharaz camp, 19.3% Basateen and 15.2% Sana'a. The stunting malnutrition was 22.0% in Kharaz camp, 23.6% villages surrounding Kharaz camp, 21.3% Basateen and 19.4% Sana'a.

The coverage of OPV3-Pentavalent3 was 64.0% in Kharaz camp, 44.3% in Sana'a, 34.4% in Basateen and 72.5% in the villages surrounding Kharaz camp. The total coverage for BCG was 93.4% in Kharaz camp, 75.7% in Basateen, and 72.4% in Sana'a 72.4% and 98.0% in the villages surrounding Kharaz camp.

Overall vitamin A supplementation coverage was 73.2% across the study locations. The coverage of vitamin A supplementations in survey locations was 80.7% in Kharaz camp, 60.8% in Basateen, 64.7% in Sana'a and 86.4% in the villages surrounding Kharaz camp.

Prevalence of acute respiratory infection was 21.3% in Sana'a, 22.2% in Kharaz camp, 16.3% in Basateen urban programme 22.0%. The prevalence of diarrhea was 25.2% in Basateen, 30.9% in the villages surrounding Kharaz camp, 36.3% in Sana'a and 25.4% in Kharaz camp. The prevalence of fever was 37.0% in Kharaz camp, 47.8% in Basateen, 45.1% in Kharaz villages and 51.6% in Sana'a.

It was found that women who initiated breastfeeding within one hours after delivery were 87.2% in Kharaz camp, 75.6% in Basateen urban program, 92.6% in villages surrounding Kharaz camp and 74.3% in Sana'a urban programme.

The prevalence of anaemia among refugee children in the urban refugee program in the city of Sana'a was 44.3%. Severe anaemia accounted for 3.4 percent, 24.5% moderate anaemia and 16.4% were mild anaemic. The prevalence of anaemia among adult women was 30.8% overall.

Acronyms

ARV	Ant Retro Viral
BCG	Bacille Calmette-Guerin Vaccine
C.I.	Confident Intervals
CMR	Crude Mortality Rate
CSSW	Charitable Society for Social Welfare
EmOC	Emergency Obstetrics Care
ENA	Essential Nutrition Action
EPI INFO	Epidemiology Processing Information software
FANTA	Food and Nutrition Technical Assistance
FGM	Female Genital Mutilation
HAZ	Height for Age Z-Scores
HIS	Health Information System
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
IDF	Interaction Development Foundation
IMR	Infant Mortality Rate
IYCF	Infant And Young Child Feeding Practices
MoH	Ministry of Health
NCHS	National Child Health System
NMR	Neonatal Mortality Rate
OTP	Out Patient Therapeutic Programme
OPV	Oral Polio Vaccination
PEP	Post exposure Prophylaxis
PMTCT	Prevention of Mother to Child Transmissions of HIV
RSD	Refugee Status Determination
SC	Stabilization Centre
SD	Standard Deviations
SFP	Supplementary Feeding Programme
SGBV	Sexual Gender Based Violence
SMART	Standardized Monitoring and Assessment of Relief and Transition
STIs	Sexual Transmission Infections
UNICEF	United Nations Children and Education Fund
WASH	Water, Sanitation and Hygiene
RSD	Refugee Status Determination
5MR	Under five years' mortality rate
UNDSS	United Nations Department of Safety and Security
UNHCR	United Nations High Commissioner for Refugees
VAM	Vulnerability Analysis and Mapping
VCT	Voluntary Counseling and Testing
WAZ	Weight for Age Z-Scores
WFP	World Food Programme
WHM	Weight for Height Percent for Median
WHO	World Health Organization
WHZ	Weight for Height Z -Scores

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1. INTRODUCTION

1.1 Background

In close collaboration with the Government of Yemen, UNHCR re-established its operations in Yemen in 1992, following the large influx of Somali refugees. The main programme objective is to provide international protection to registered refugees, asylum seekers, internally displaced persons and other people of concerns in both the refugee camps and urban situations. The operation also provides basic humanitarian assistance and support that is aimed at attaining durable solutions. As of the end February 2009, a total of 140,148 refugees were being assisted and supported by UNHCR in Yemen. Most of the refugees come from Somalia, Ethiopia, Iraq, and Eritrea. Yemen has traditionally adopted an open door policy to Somalis, granting them *prima facie* refugee status while other nationalities go through the refugee status determination (RSD) interviews. Majority of the refugees in Yemen stay in the urban and about 11,500 refugees stay in Kharaz camp. This year, more than 48,000 new arrivals arrived at the shores of Yemen, majority of whom moved to the urban areas where there is already limited resources and hence an increased strain on the government.

1.2 Public health status

In Yemen, public health and primary health care services in the refugee program is comprehensively implemented by UNHCR implementing partners. In 2008, core program indicators were maintained within acceptable UNHCR standards; the crude mortality rate (CMR) was 0.09 per 1,000 population per month; the standard indicator is <1.5 deaths per 1000 population per month. The under 5 years mortality rate (U5MR) was 0.22 deaths per 1,000 population per month, the standard indicator is <3.0 deaths per 1000 population per month, the infant mortality rate (IMR) was 13.4 deaths per 1,000 population per month where as the standard indicator is <60 deaths per 1,000 population per month and the neonatal mortality rate (NMR) was 7.5 deaths per 1,000 population per month, the standard indicator is <40 per 1000 live births per month.

The clinics in both Basateen and Kharaz camps are within the walking distance. Health services that include curatives and preventive services are provided free of charge in both locations. The patients who can not be treated at the camp health facilities are referred to Aden or Sana'a in the public health facility for more specialized health care services. Registered refugees in the Kharaz camp and Sana'a urban refugee program enjoy free health services while in Basateen urban refugee programme contribute a subsidized reduced fees. Harmonization of health services across in the refugee operation is in progress. Health services are provided by Iinteractions Development Foundation (IDF) in Sana'a, in Basateen and Kharaz are provided by Charitable Society for Social Welfare (CSSW).

1.3 Food aid and nutrition

The refugees in Kharaz camp receive food aid support from WFP, the food ration is comprised of 300g Wheat Flour, 150g Rice, 60g Pulses, 20g Sugar, 25g Vegetable Oil, 5g Salt, through a general food distribution which is conducted once in a month, occasionally refugees receive 67g Dates. The standard food ration provides an average of 2100 kilocalories per person per day which is in accordance with the agreement between UNHCR and WFP. Training on a new community based management of malnourished children was conducted for 23 staff. As part of support to the refugee food security; availability and accessibility to micronutrients UNHCR distributed 225,260 sachets (70g per refugee) of tomato paste in Kharaz camp. Maternal nutrition to pregnant women and lactating mothers is dealt through Supplementary Feeding Program (SFP). There is a need to strengthen the capacity of staff and the structure of the SFP, Outpatient Therapeutic Program (OTP) and Stabilization Centre (SC) in Basateen and Kharaz camps. Food security initiative undertaken by refugees needs to be properly designed so as to provide expected return to the household food security. Vulnerable families in Sana'a receive support through a food voucher system.

1.4 Reproductive health services

Access to comprehensive and integrated reproductive health services is provided to refugees in the urban refugee programme through IDF clinic in Sana'a, CSSW clinic in Basateen and Kharaz camp. The health implementing partners of UNHCR received technical and material support for reproductive health services; pregnant women are screened and treated for health risks like STIs. An evaluation on the quality of reproductive health services was conducted, which resulted into improved coordination in the safe motherhood programme. Women in reproductive age received sanitary materials and soap to support personal hygiene promotion. Services related to maternal and child health is provided in the refugee health clinics by the health partners. In 2008, in Kharaz camp the coverage of complete antenatal care (4 or more visits) was 93%, the UNHCR standard indicator is 100%. The proportion of deliveries attended by skilled personnel was 80%, the standard indicator is >=50%; the proportion of deliveries in the Emergency Obstetrics Care (EmOC) facilities was 100%, the standard indicator is >= 50%. The proportion of low birth weight deliveries (<2500 grams) was 18%[1] of all deliveries and the standard indicator is <15%.

1.5 HIV/AIDS

UNHCR Yemen implements the UNHCR global strategy on HIV/AIDS of which among other issues entails programs on prevention and treatment of HIV/AIDS; voluntary counseling and testing (VCT), prevention of mother to child transmission of HIV/AIDS (PMTCT), treatments of opportunistic infections, programs related to use of ant-retro-viral (ARVs). Other programs implemented in 2008, included programs on youth peer education that was initiated in 3 sites, promotion and distribution of male condoms and preventive health education against spread of HIV and STIs. Training activities included universal precaution measures to health staff, which was attended by both national, and refugee staff and training on post exposure prophylaxis (PEP). The challenge in the HIV/AIDS programme lies in the cultural domains; this affects the programme due to high stigma and discrimination in the society. UNHCR implements awareness programs to counteract such negative sentiments through information, education and communication, training workshops, awareness and sensitization campaigns.

1.6 Sexual Gender Based Violence program (SGBV)

In 2008, a total of 132 cases of SGBV survivors received timely medical, psychosocial and protection support. In order to strengthen responses to SGBV cases, capacity building on the management and provision of psychosocial support was provided to 26 members of the grand Somali Civil Society in Kharaz camp, the same training was given to the Grand Council in Basateen. Workshops related to discouraging taboos that are rooted on female genital mutilation (FGM) were organized and conducted to leaders in Kharaz camp.

1.7 Health Information System

The UNHCR Health Information System (HIS) was launched in Yemen refugee programme in June 2008 and training on data collection, completion of the register books for each department, data entry and uploading of the data in the HIS data base were done extensively. In order to improve the quality of the information collected, refresher training is planned to take place in June 2009.

1.8 Water, Sanitation and Hygiene Promotion (WASH)

This is one of the life saving programs that ensure both mortality and morbidity are kept within standards. Distribution of adequate, safe and clean water reduces prevalence of water born diseases.

[1] UNHCR's Public Health High Commissioner Special Project: Progress update 2007 – 2008; February 2009

In 2008, refugees in Kharaz camp received 49 liters per person per day of safe and clean water in average which was above UNHCR standards; the standard is 20 liters per person per day. In Basateen settlement; refugees, returnees and host community have difficulties in getting adequate safe and clean water; they receive below 20 liters per person per day. In Basateen refugees depend much on shallow wells. Programme on testing and treatment of water in these wells exists, chlorination is performed. It is important to underscore the fact that Basateen urban refugee settlement is densely populated and the hygiene system is of public health concern. Refugees in Kharaz camp receive cooking utensils, water storage facilities and soap for washing.

2. GENERAL OBJECTIVE

This survey mainly investigated elements related to child survival program in the refugee communities in Kharaz refugee camp in Lahjj governorate, Basateen urban refugee programme in Aden governorate and Sana'a urban refugee population in the capital city of the Republic of Yemen. The survey worked into estimating the prevalence of global acute malnutrition, henceforth, determining the health and nutritional status of the refugees and some host communities living together with refugees. The report is intended to serve as a reference document that will assist programmers and implementers in designing and implementing the public health nutrition schemes in order to improve the life of the refugees and host communities surrounding the refugee sites.

2.1 Specific objectives

2.1.1 To estimate the current nutritional status of children aged 6 to 59 months that entails estimation of the global acute malnutrition, chronic malnutrition and underweight.
2.1.2 To estimate the vaccination coverage of Bacille Calmette-Guérin vaccine (BCG), measles and Oral Polio Vaccine (OPV) and Pentavalent antigens.
2.1.3 Assess the coverage of micronutrient utilization, specifically, estimating the coverage of vitamin A supplementation.
2.1.4 To estimate the morbidity prevalence among under five year's children on three main common childhood diseases, namely, fever, acute respiratory infection and diarrhea
2.1.5 To determine infant and young child feeding practices through selected standard monitoring indicators *(acknowledge FANTA IYCF indicators).*
2.1.6 To estimate the general crude mortality and under 5 years mortality rates among refugee population and host community around the refugee sites.
2.1.7 Assessing haemoglobin levels among children aged 6 to 59 months and women of reproductive age (15 to 45 years old) – *(investigated in Sana'a study only).*

3. SUBJECTS AND METHODOLOGY

3.1 Methodology

This was a cross sectional population survey, cluster sampling was used; 30 clusters were established in each survey location. In each cluster 30 children were sampled. The target study population was children aged 6.0 to 59.0 months with 65.0 to 110.0 cm length / height.

3.2 Nutrition survey variables studied

In this study age in months or birth date, sex, weight and height were recorded. Oedema was diagnosed by applying moderately thumb (fingers) pressure above the feet's to determine the first level of oedema. If there was oedema a depression due to the exerted pressure would remain for at least three seconds (or the measurer will count three times – one thousand and one, one thousand and two and one thousand and three). The child would only be recorded as having oedema if bilateral depression following the exerted pressure was clearly seen. Any child diagnosed to have oedema would have to be reported and verified by the survey Supervisor and would immediately be referred to the health facility as per existing protocols.

Other variables studied in this survey included, infant and young child feeding, morbidity specifically for fever, diarrhea and acute respiratory infection, immunization program for BCG, OPV, pentavalent and measles, coverage of vitamin A supplementation and retrospective mortality. In the Sana'a survey haemoglobin measurement was added to establish the levels of anaemia prevalence among under 5 year's children and women at reproductive age. In Basateen and Kharaz camps UNHCR in collaboration with MENTOR commissioned a separate survey on malaria and anaemia.

3.3 Survey tools

Data collection sheets were translated into Arabic, the local language easily understood by both respondents and survey teams and enough copies of the questionnaire were made available to each team to capture data of the required number of children. Survey team members were thoroughly oriented on proper taking and recording of measurements as obtained from the respondents.

3.4 Organization of the survey

Meeting with the refugee leaders and implementing partners were convened before commencement of survey. The partners were informed of the purposes of the survey, their roles, duration and parameters to be assessed; they participated in discussing the survey methodology, formation of survey teams and its composition and physical sampling of children at household level. Refugee leaders in all locations were the key actors in providing information related to the survey area and helped with establishing the boundaries for each cluster. Each team had one refugee leader, the roles of the leaders was to explain to each family the objectives of the survey and giving assurance to the refugee community about the survey in general. The nutrition survey tools and equipments were mobilized by the country office in Yemen, these included, weighing scales, pants, stick – rods, height boards, haemocue, safety lancets, micro-curvets, cotton wool and antiseptics.

3.5 Ethical considerations

Consent was sought from the study subjects on the day of survey; they were requested to participate however those who decided not to be assessed there decision was respected.

Family heads were informed that collected data / information would be confidentially treated. An NCHS reference sheet was given to each team, this was used to determine the cut off point about the nutritional status of the children; children who were found malnourished or with oedema using the referral sheet given to each were referred to the feeding programme where reviewed and nutritional support and assistance were given.

3.6 Data entry, analysis and report writing

Data entry was done in computer programme EPIINFO (version 6.04b); cleaning of data and analysis was done using SMART for ENA and EPIINFO (version 6.04b) programme.

The reference table below is used by WHO to classify the severity of malnutrition, in this survey, this table is applied to classify the magnitude of malnutrition problem to wasting (weight for height), chronic malnutrition (height for age) and underweight (weight for age).

Table 1 presents the prevalence categories used to describe the severity results for anthropometric indicators (WHO 1995)

Prevalence group	Prevalence ranges (% of children <-2 Z scores)		
	Low weight for height	Low height for age	Low weight for age
Acceptable	< 5	< 20	< 10
Poor	5 – 9	20 – 29	10 – 19
Serious	10 – 14	30 – 39	20 – 29
Critical	> 15	> 40	> 30

3.7 Definitions of malnutrition and anaemia prevalence

In this nutrition surveys report the three forms of traditionally known as protein energy malnutrition are defined independently as;

3.1.7 Wasting

- Global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema,
- Severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema

3.1.8 Stunting

- Stunting malnutrition is defined as <-2 z scores height –for- age and/or oedema,
- Severe stunting malnutrition is defined as <-3z scores height- for – age and/or oedema

3.1.9 Underweight

- Underweight malnutrition is defined as <-2 z scores weight-for-age and/or oedema,
- Severe underweight malnutrition is defined as <-3z scores weight-for-age and/or oedema

Exclusion of outliers: SMART flags

4. ANTHROPOMETRIC RESULTS (NCHS 1977 REFERENCE VALUES) AND SUMMARY DISCUSSION

The age distribution of the measured children is presented on the table below. The proportion of boys and girls in each age group was almost similar. The sex ration indicates that boys and girls were equally represented. There was no biasness in terms sampling girls or boys as they were not targeted. Younger children were slightly more in number as accounted for 25.1 percent of all the sampled children.

Table 2. Distribution of age and sex combined all sites

Age groups by months	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
6-17 months	357	49.2	368	50.7	725	25.1	0.9
18-29 months	373	53.1	330	46.9	703	24.3	1.1
30-41 months	286	51.7	267	48.3	553	19.1	0.9
42-53 months	299	50.7	291	49.3	590	20.4	1.1
54-59 months	151	47.0	170	53.0	321	11.1	0.8
Total	1466	50.4	1426	49.6	2892		1.1

The overall sex ratio between boys and girls from the above table is 1.1.

4.1 Child nutritional status

The table below, presents the nutritional status results for all the surveyed locations, the forms of malnutrition presented includes; global acute malnutrition (GAM), severe acute of malnutrition (SAM), chronic malnutrition (stunting) and underweight;

Table 3 Prevalence of malnutrition in children aged 6 – 59 months by survey sites

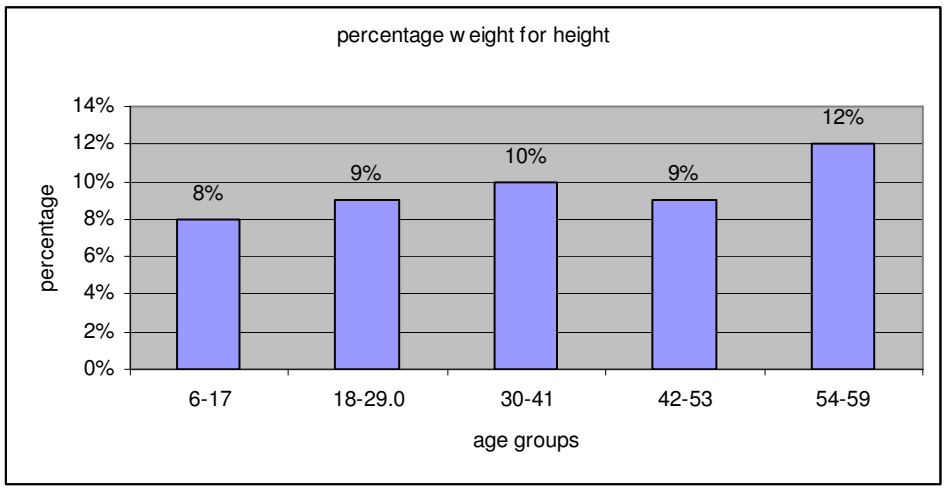
Anthropometric Indices	**Kharaz**	**Kharaz villages**	**Basateen**	**Sana'a**	**Combined**
Global acute malnutrition WHZ <-2 z scores and /or oedema (*95% C.I.)*	7.2% (5.4 – 9.5)	9.9% (6.5 – 14.8)	9.2% *(6.2-13.5)*	10.9% (8.0 – 14.6)	9.3% (5.3 – 13.1)
Moderate acute malnutrition (-3 - <-2SD) *95% C.I.*	6.8% (5.0-9.2)	8.9% (5.7 - 13.6)	9.0% *(6.1-13.1)*	10.1% (7.6 – 13.2)	8.7% (6.1 – 12.3)
Severe acute malnutrition (WHZ <-3 z scores and /or oedema) *95% C.I.*	0.5% (0.2 – 1.2)	1.0% (0.3 – 3.5)	0.2% *(0.1 0.9)*	0.8% (0.4 – 1.7)	0.6% (0.3 – 1.8)
Prevalence of underweight malnutrition WHZ <-2 z scores and /or oedema (*95% C.I.)*	19.7% (16.2- 23.7)	27.0% (21.3 – 33.4)	19.3% *(15.9-23.1)*	15.2% (11.4–19.9)	20.3% (16.2 – 25.0)
Moderate underweight malnutrition (-3 - <-2SD) *95% C.I.*	18.2% (14.9-22.0)	25.5% (20.0 – 31.9)	18.3% *(15.1-21.9)*	13.6% (10.5-17.5)	18.9% (15.1 – 23.3)
Severe underweight malnutrition (WHZ <-3 z scores and /or oedema) *95% C.I.*	1.5% 0.9-2.5)	1.5% (0.5 – 4.2)	1.0% *(0.6-1.8)*	1.6% (0.6-3.9)	1.4% (0.7 – 3.1)
Prevalence of stunting malnutrition HAZ <-2 z scores and /or oedema (*95% C.I.)*	22.0% (18.2 – 26.3)	23.6% (18.3 – 29.9)	21.3% *(17.8-25.2)*	19.4% (16.0–23.4)	21.6% (17.6 – 26.2)
Moderate stunting malnutrition (-3 - <-2SD) *95% C.I.*	16.8% (13.7 -20.5)	19.7% (14.8 – 25.7)	17.7% *(14.4-21.5)*	16.4% (13.3-20.0)	17.7% (14.1 – 21.9)
Severe stunting malnutrition (HAZ <-3 z scores and /or oedema) *95% C.I.*	5.2% (3.7 – 7.4)	3.9% (2.0 – 7.6)	3.6% *(2.3- 5.6)*	3.0% (2.0-4.3)	3.9% (2.5 – 6.2)

4.2 Weight for height

The prevalence of global acute malnutrition for wasted children (weight for height <-2 Z score) combined from the survey sites was 9.3 percent (95% C.I 5.3 – 13.1). This level falls within the "poor" category according to WHO classification of severity of malnutrition. The upper limit of the confidence interval falls with the "serious" category. Kharaz camp had a global acute malnutrition rate of 7.2 percent (95% C.I 5.4 – 9.5); this is the lowest prevalence when compared to Basateen, Sana'a and villages surrounding Kharaz camp. Refugees in Sana'a have the highest global acute malnutrition prevalence of 10.9 percent (95% C.I 8.0 – 14.6), according to WHO classification it falls in the 'serious" category. Basateen urban refugee settlement depicted the second highest prevalence of global acute malnutrition, 9.2 percent (95% C.I 6.2-13.5). Villages surrounding Kharaz camp had 9.9 percent (95% C.I 6.5 – 14.8) prevalence of wasting.

The mean weight for height Z-scores was -0.64±0.97 for Kharaz, whereas the mean weight for height for Basateen was -0.60±1.05.

Figure 1 Prevalence distribution of wasting among children aged 6 – 59 months



A total of 8 percent of the children in the lowest age group (6 – 17 months) were wasted. This trend increased at age 18-29 months. Malnutrition increases as the age of the children increased. There was a slight decrease of wasting among children aged 42-53 months as compared to the children aged 30-41 months, malnutrition increased to 12 percent among 54-59 months children. Figure 1

From the above figure wasting is almost normally distributed across the age groups. Henceforth intervention programs need to focus on prevention of malnutrition from when the mother is pregnant until when the child is 3years. Programs supporting maternal nutrition during pregnancy followed by promoting, protecting and supporting exclusive breastfeeding to 6 months and continued provision of complementary food to 3 years of age need to be designed and implemented.

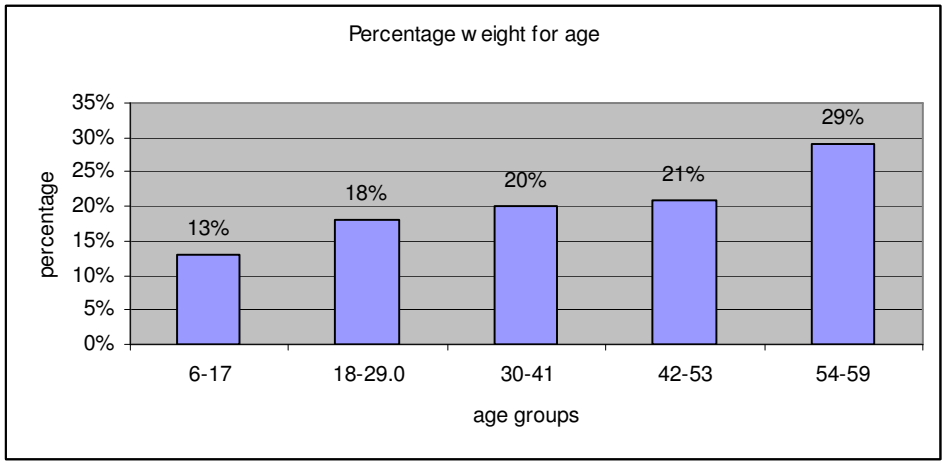
4.3 Weight for age

Referring to table 3, Kharaz camp had the highest underweight prevalence, 19.7 percent (95% C.I 16.2 – 23.7) weight for age as compared to Basateen and Sana'a. Basateen had 19.3 percent (95% C.I 15.9 – 23.1) weight for age and the prevalence of underweight in Sana'a was 15.2 percent (95% C.I 11.4–19.9) weight for age. The overall prevalence of underweight was 20.3 percent (95% C.I. 11.4 – 19.9) weight for age <-2 Z-score across the survey locations, this falls in the "serious" category as per

WHO. The prevalence of severe underweight (<-3 Z score) across the locations was 1.4 percent (95% C.I 0.7 – 3.1).

Underweight is responsible for several deaths, majority of children suffer from this form of malnutrition in mild and moderate state. It is a result of inadequate dietary intake, compromised immune systems, and frequent episodes of diseases including mild diarrhea, fever and acute respiratory infection.

Figure 2: Prevalence of underweight by age groups



The prevalence of underweight started to increase immediately from second age group (18 – 20 months) to the highest age group (54 – 59 months). Underweight malnutrition is a combination of both wasting and chronic malnutrition; children suffer double impacts of both wasting and chronic malnutrition.

From the third age group (30-41 months) to the firth age group (54-59 months) the prevalence of underweight is equal among the age groups and is higher than 20 percent based on WHO criteria the prevalence of underweight in these groups is on the "higher" category.

4.4 Height for age

The prevalence of stunted children (height for age <- Z score) aged 6 – 59 months in this survey overall is 21.6 percent (95% C.I 17.6 – 26.2). The prevalence of severely stunted children (<-3 Z score) aged 6 – 59 months is 3.9 percent (95% C.I 2.5 – 6.2). The highest stunting prevalence was in Kharaz camp with 22.0 percent (95% C.I 18.2 – 26.3) among refugee sites. Kharaz villages had the highest stunting prevalence, 23.6 percent (95% C.I 18.3 – 29.9). Table 3 refers.

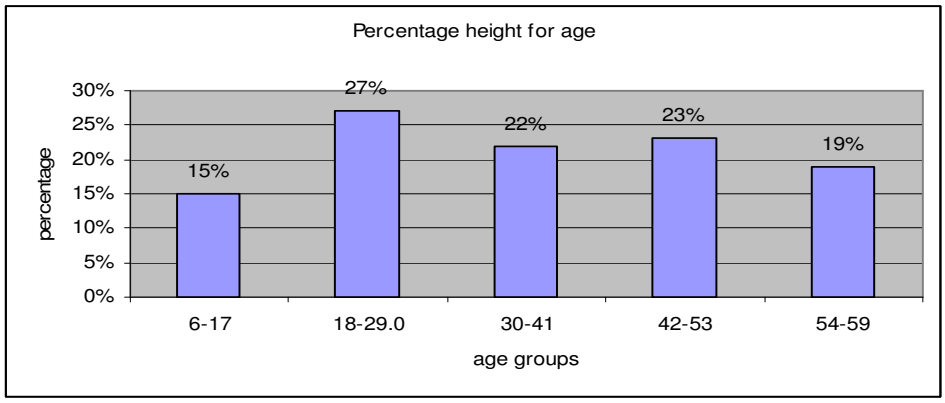
The prevalence of stunting in Basateen was 21.3 percent (95% C.I 17.8-25.2) this is the second highest prevalence when compared in to other locations. Children at the age of 18 – 29 months were affected mostly by stunting when compared with other age groups. According to WHO these levels fall with the "poor" category.

Kharaz camp had the highest severe prevalence of height for age -<3 Z score of 5.2 percent (95% C.I 3.7 – 7.4) and Sana'a had the lowest severe height for age -<3 Z-score; 3.0 percent (95% C.I 2.0 – 4.3). The prevalence of stunting (chronic malnutrition) among children in Sana'a urban refugee program height for age (<-2 Z score) was 19.4 percent (95% C.I 16.0–23.4).

The mean height for age Z scores for children in Kharaz camp was -0.97±1.24. The mean height for age Z - score in Basateen was -1.04±1.14. Although the prevalence of stunting in Basateen was

smaller than that of Kharaz camp, the mean Z-score indicates that children in Basateen were equally or more affected by stunting as compared to in their fellow children in Kharaz camp.

Figure 3 The prevalence of chronic malnutrition (height for age <-2 Z score) at 95% confidence intervals by age groups



The mean height for age Z score for children in Sana'a was -0.78±1.24 this shifted slightly away from zero more than that of Kharaz camp, and this can be concluded that children in Sana'a were equally or higher affected by stunting like that of Kharaz camp. The mean Z score for the height for age among these children can be summarized that children are growing in a prolonged period of inadequate food and nutrient intake as the result their growth and development at childhood period is impaired.

4.5 Weight for height percentage of the median

Results were also presented using percent for median; feeding programs uses percent for median in developing admission and discharge criteria. The moderately malnourished percent for median are also used to estimate the number of children that will join the supplementary feeding programs.

Table 4 Prevalence of wasting (weight for height % median) among children aged 6.0 – 59.0 months (based on NCHS reference 1997)

Camp	N	Wasting (median % with 95% CI)			
		Severe (<70% median and or oedema)	Moderate (>=70% - <80%)	Global (<80% median and or oedema)	Normal (>=80% median
Kharaz	889	0.1 (0.0 - 0.9)	4.7 (2.6 - 8.3)	4.8 (2.7 - 8.4)	95.6 (94.1 – 97.1)
Basate'en	894	0.1 (0.0 - 0.9)	4.8 (2.7 - 8.4)	4.9 (2.9 - 8.5)	95.5 (94.1 – 97.0)
Kharaz Villages	201	1.0 (0.3 - 3.6)	5.9 (3.4- 10.1)	6.9 (4.2 - 11.4)	94.5 (88.9 – 96.1)
Sanaa	902	0.6 (0.1-2.9)	7.0 (4.5-11.0)	7.5 (4.6-12.4)	92.5 (90.6 – 94.2)
Combined	2886	0.5 (0.1 – 2.8)	5.6 (3.3 – 9.7)	6.3 (3.6 – 10.2)	94.5 (91.9 – 96.0)

The prevalence of oedema is 0.0%

It was found that the prevalence of wasting percent for median among children aged 6 to 59 months based on NCHS reference 1977 was 4.8 percent (95% C.I 2.7 - 8.4) and 4.9 percent (95% C.I 2.9 - 8.5) for Kharaz and Basateen refugee sites respectively. The prevalence of wasting percent for median children surveyed in the villages surrounding Kharaz camp was 6.9 percent (95% C.I. 4.2 – 11.4). The prevalence of wasting as expressed by weight for height percent for median was 7.5 percent (95% C.I 3.6 – 10.2).

4.6 Comparing 2008 and 2009 nutrition survey results

Comparing the findings; there was no significant difference between 2008 and 2009 survey results. In 2008, GAM was13.6 percent (95% C.I 8.5 – 18.6) for villages around Kharaz camp and in 2009 the GAM is 9.9 percent (95% C.I 6.5 – 14.8) only numerical change can be observed.

Table 5 Comparing nutrition survey results of May 2009 and February 2008

	Thresholds	Date	Kharaz	Kharaz villages	Basateen	Sana'a
Global acute malnutrition	WHZ <-2 z scores and /or oedema	2009	7.2%	9.9%	9.2%	10.9%
		2008	6.5%	13.6%	8.4%	
Severe acute malnutrition	WHZ <-3 z scores and /or oedema	2009	0.3%	1.0%	0.2%	0.8%
		2008	0.7%	0.0%	1.2%	
Underweight	WAZ <-2 z scores	2009	19.7%	27%	19.4%	15.2%
		2008	18.2%	32.4%	24.9%	
Stunting	HAZ <- 2 z scores	2009	22.0%	23.8%	21.3%	19.4%
		2008	16.5%	23.1%	24.9%	

Although these results are not on the critical situation according to WHO; still presents a worse nutritional status of the children in the operation areas and including the local communities living together with the refugees this requires strengthening implementation of the child survival programme and infant and young child feeding programme within the framework of the millennium development goals.

5. FACTORS ASSOCIATED WITH CHILDREN MALNUTRITION

5.1 Care and, infant and young child feeding practices

In Basateen and Sana'a single female heads of families exchange labour to earn income to provide basic needs to their families. Children are sent to kinder gardens, or left at home with their elder siblings. Children lack parenthood care from their parents. Infants are not exclusively breastfed and older children go hungry throughout their childhood. In the urban program breast milk substitute's is used by women, during the survey for example some women were found bottle feeding their children.

5.2 Dietary diversity

Community efforts to diversify the food basket given during general distribution are limited; in Kharaz camp options to complement the general ration are scanty. Kitchen gardening is rarely practiced due to water shortages and soil textures not favoring growing of vegetables. Children are not fed frequently, dietary diversity and nutritional quality is not assured. Children do not get essential nutrients for healthy growth and development; this may includes foods such as milk, meat, fruit, vegetables etc. in the past refugees in Kharaz camp tried to establish kitchen gardening but could not maintain due to water and weather limitations.

5.3 Health and hygiene environment

In Sana'a for example during the survey some of the refugee houses were found without water and not cleaned and houses environment were not clean; this situation affected their personal hygiene, practices like hand washing after toilet and bath, family and children food preparation is normally affected when the environmental health of the families is not assured. In Basateen, community involvement in the management of environment health should be encouraged through environmental health and hygiene days.

5.4 Distribution of food and non food items related to food security

Refugees in Kharaz camp receive 2100 kilocalories per day; this is the agreed energy value to be distributed. In 2008 few food distributions circles refugees received reduced food ration. The food basket provided is short of fats, it composed only of 12.3%, the minimum recommended is 17%. Refugees are expected to do income generating activities to supplement the food aid. There is low level of copping mechanism to improve household income.

5.5 Inadequate self reliance opportunities

There are very minimal opportunities for refugees to undertake economic activities that can improve household livelihood. In practice refugees are not employed in meaningful job opportunities in the country, the refugee labour force is not contributing substantially to the national economy as is not recognized yet by the government. Employment opportunities are minimal; camp remoteness offers limited self reliance activities. Micro finance credit offered by UNHCR partners is an opportunity that is helping refugee families to complement diet needs at family level.

5.6 Access to nutrition treatment feeding programme

In Basateen urban refugee program treatment of acute severe malnutrition cases is implemented as per MoH and UNICEF protocols, this programme is not available in Kharaz and Sana'a. In Kharaz the SFP is implemented by CSSW, this service is not available in Basateen and Sana'a. Plans are underway to establish feeding programs that are not available in each location. UNICEF jointly with UNHCR is planning to conduct trainings on infant and young child feeding practices and management of severe acute malnourished children before the end of July 2009.

6. RETROSPECTIVE MORTALITY

The objective of this variable was to understand the perception of the population on the deaths happening in the community and to collate the findings with the mortality rate reported in the monthly HIS statistics. Retrospectively with 90 days recall period preceded the survey heads of families were asked if deaths happened in their families.

6.1 Estimating mortality

The two major forms of mortality i.e. crude and under 5 years' mortality rates (CMR and <5MR) were aggregated by age and finally computed for each specific survey site.

The formula below was used to calculate the mortality rates;

Mortality Rate= n / [((n +N) +N) / 2]

Where: n = number of deaths
N = number of people alive on the day of the survey
90 days = recall period
10,000 = used to express mortality rate per 10,000 people per day.

Table 6 Crude and < 5 years mortality rates as expressed by 10,000 people per day

Camp	Population	*expressed by 10,000 people per day at 95% C.I*	
		CMR survey results	0 – 5 Year death rate
Kharaz camp	5775	0.46 (0.28 – 0.75)	1.30 (0.57 – 2.95)
Basateen	5590	0.35 (0.23 – 0.52)	1.42 (0.67 – 2.99)
Kharaz villages	1137	0.51 (0.16 – 1.63)	2.49 (0.71 – 8.37)
Sana'a	5523	0.43 (0.30 – 0.63)	2.10 (1.15 – 3.80)
Combined	18,025	0.46 (0.30 - 0.83)	1.50 (0.60 – 4.34)

6.2 Retrospective mortality results

A total of 18,025 refugee population and nationals where involved in the mortality survey. The combined crude mortality rate from the above table was 0.46 (95% C.I 0.30 – 0.83) deaths per 10,000 population per day. The under 5 mortality rate was 1.5 (95% C.I 0.60 – 4.34) per 10, 000 population per day. Sana'a had the highest under 5 year's mortality rate of 2.1 per 10,000 populations.

In 2008 the crude mortality rate for all camps was 0.09 deaths per 1,000 populations per month and the under 5 years' mortality rate was 0.22 deaths per 1000 population per month[2]. Total deaths that were reported in each site during surveys were 21 deaths in Sana'a of them 14 were under 5 years; in Basateen 17 deaths, of them under 5 years were 10; in Kharaz camp 23 deaths, under 5 year's were 9; for the local villages surrounding Kharaz camp 6 deaths were reported, 3 were under 5 years. The main cause of deaths among under 1year is neonates deaths, other diseases includes upper and lower respiratory tract infection, acute watery diarrhoea, cardiovascular disease, urinary tract infection and anaemia. Prolonged inadequate dietary intake when interacts with diseases has been reported to cause deaths

[2] 2008 UNHCR Annual Health Information System report, UNHCR Yemen

6.3 Comparing mortality from survey and annual HIS mortality

An attempt was made to recalculate these deaths using the UNHCR health information system (HIS) formula for comparison purposes; expressing the mortality rates at deaths per 1,000 populations per month. The combined crude mortality rate was 0.3 deaths per 1,000 population per month; the UNHCR standard crude mortality rate is <1.9 deaths per 1,000 population per month. The under 5 years mortality rate was 0.9 deaths per 1,000 population per month; the UNHCR standard for under 5 years mortality rate is <3.0 per 1,000 per month. Table 6 below summarizes the recalculated mortality:

Table 6 Crude and < 5 years mortality rates as expressed by 1,000 people per day

Camp	Population	*expressed by 1,000 people per month*	
		CMR recalculated	< 5MR
Kharaz camp	11,500	0.6	1.3
Basateen	40,000	0.1	0.4
Kharaz villages	1,500	1.3	3.3
Sana'a	17500	0.4	1.3
Combined	70,500	0.3	0.9

The results from the above table augers well with the 2008 crude mortality rates as reported by the annual UNHCR health information system.

7.0 EXPANDED PROGRAM FOR IMMUNIZATION AND VITAMIN A SUPPLEMENTATION

Immunization program prevents children from contracting serious infectious diseases that can raise morbidity and mortality. Immunization controls spread of diseases and prevents outbreaks; children are vaccinated following standard vaccination schedule based on the national immunization program under MoH and UNICEF. In order to ensure efficient cold chain program UNICEF works closely with MoH. The following are the antigens given; measles, polio, tuberculosis, diphtheria, tetanus, pertusiss and hepatitis. This study assessed the coverage of measles, Bacille Calmette-Guérin vaccine (BCG), oral polio vaccination (OPV) and pentavalent one and three.

7.1 Measles vaccination

Prevention of measles can be achieved by vaccinating where possible and justifiable children from 6 months to 14 years in emergencies[3]. In this survey measles was assessed by two ways; looking for vaccination date for which measles shot was given and by recall, asking the mother / father or other guardians if the child had received measles. Findings show that Kharaz camp had the highest measles coverage, 79.1 percent followed by Basateen and Sana'a urban refugee site with 73.2 percent and 66.7 percent respectively. The local villages surrounding Kharaz camp had 89.6 percent coverage. The coverage referred to children who received measles vaccination at =>9 months of age. The MoH in Yemen recommend that measles should be given to children at age 9 months and repeated again at age 18 months. UNHCR and UNICEF encourage operations to attain equal and above 95 percent of measles coverage. Table 7 below summarizes the measles results.

Overall about 23 percent of the eligible children had not received measles vaccination at the time of the survey. Humanitarian actors are encouraged to raise the coverage of measles vaccination to reach the UNHCR set standard. UNICEF is supporting the child survival and EPI programme in Yemen including refugees and WHO provides technical support. MoH supervises health and nutrition activities in the refugee camps. It is important that a comprehensive plan of action is developed to ensure that children who have not received measles vaccination are vaccinated. 667,630 children aged 1-5 years were vaccinated against measles in al Hudeidah, Hadramout and al-Mahrah. The government is planning a nationwide campaign in the last quarter of 2009 in a bid to make Yemen measles free. In Yemen 7-8 percent of children infected with measles die.

Table 7 Percentage coverage of measles vaccination for children aged 9.0 – 59.0 months

		% of measles coverage; children aged =>9.0 months			
Camp	N	By card	By recall	=>9 months	Not vaccinated
Kharaz	835	48.6	30.5	79.1	20.9
Basateen	811	24.4	48.8	73.2	26.8
Village's Kharaz	192	51.6	38.0	89.6	10.4
Sana'a	847	33.2	33.5	66.7	33.3
combined	2685	39.45	37.7	77.15	22.85

7.2 Oral polio vaccination

Oral polio vaccination in Yemen is given at birth; this dose is known as polio zero. The subsequent doses i.e. first, second and third doses are given as per MoH immunization schedule, usually given together with pentavalent at week 6, 10 and 14. The coverage of OPV1and Pentavalent-1 by location were as follows, 64.9 percent in Kharaz camp, 45.8 percent in Sana'a, 40.2 percent in Basateen and

[3] WHO manual for health workers on child illness in emergencies for humanitarian workers; 2008, Geneva

73.5 percent villages surrounding Kharaz camp. The survey also assessed the coverage of OPV3-Pentavalent-3, results were; 64.0 percent in Kharaz camp, 44.3 percent in Sana'a, 34.4 percent in Basateen and 72.5 percent in the villages surrounding Kharaz camp. Since 2005, the government of Yemen implemented campaigns to eradicate polio; the last campaign was in November 2008. On the 13th May 2009, in coordination with WHO, the government of Yemen declared that the country was now a polio free nation. The last polio case was registered in February 2006.

Table 8 Percentage coverage of opv-1 and pentavalent-1vaccination, children 6.0–59.0 months

		% of opv-pentavalent-1 and opv-pentavalent-3 among children aged 6.0 – 59.0 months	
Camp	N	OPV-pentavalent-1	OPV-pentavalent-3
Kharaz	892	64.9	64.0
Basateen	894	40.2	34.4
Village's Kharaz	204	73.5	72.5
Sana'a	902	45.8	44.3
Combined	2892	44.7	42.8

7.3 Bacille Calmette-Guérin vaccine (BCG)

This vaccine prevents tuberculosis and is given at birth. This study estimated BCG coverage through summing up recorded data from the vaccination card and presence of scar on the left shoulder. The total counts of responses both "by card" and "by scar" were summed to establish the coverage. Results indicated 93.4 percent in Kharaz camp, 75.7 percent in Basateen, and 72.4 percent in Sana'a and 98.0% in the villages surrounding Kharaz camp had received BCG. By 2007, WHO and UNICEF estimated that about 64 percent of the children received BCG vaccination[4] in the Republic of Yemen.

Table 9 Percentage coverage of BCG vaccination for children aged =>9.0 – 59.0 months

		% of children received BCG among children, 6.0 – 59.0 months			
Camp	N	By card	By scar	Total coverage	Not vaccinated
Kharaz	892	63.0	30.4	93.4	6.6
Basateen	894	43.5	32.2	75.7	24.3
Village's Kharaz	204	54.4	43.6	98.0	2.0
Sana'a	902	37.8	34.6	72.4	27.6
combined	2892	49.7	35.2	84.9	15.1

7.4 Vitamin A supplementation

Vitamin A deficiency among children results into loss of vision, night blindness and reduced body immunity. Food based sources of vitamin A in the refugee camps depends much on the provision of fortified cooking oil or wheat soy blend. WFP is committed to providing food products that are fortified with vitamin A; these include vegetable cooking oil and in wheat soy blend which is important to children's porridge to people in emergencies. Fresh foods and dark green vegetables are in short supply in the camps as opportunities to cultivate are limited.

[4] The State of the world's children 2008; child survival, unite for children; UNICEF December 2007 and Demographic health survey – for Yemen

From age 9 months children start receiving vitamin A supplementation which is repeated again at age 15 months. Thereafter the MoH protocol requires children to continue receiving vitamin at an interval of 6 months intermittently up to age 5 years.

From the table below, overall vitamin A supplementation coverage is 84.9 percent. In Kharaz camp the coverage obtained is 93.4 percent; in Basateen is 75.7 percent, in Sana'a is 72.4 percent and in the villages surrounding Kharaz camp is 98.0 percent. Table 10 illustrates

Table 10: Percentage coverage of vitamin A supplementation to children aged =>9.0 – 59.0 months

		% of children received vitamin A at age 9.*0 – 59.0* months			
Camp	N	By card	By recall	=>9 months	Not supplemented
Kharaz	835	46.7	34.0	80.7	19.3
Basateen	811	19.1	41.7	60.8	39.2
Village's Kharaz	192	49.5	36.9	86.4	13.6
Sana'a	847	35.1	28.8	64.7	35.3
Combined	2685	37.6	35.4	73.2	26.8

WHO and UNICEF have recommended that children should receive vitamin A capsules at an interval of 6 months until when are 5 years. The UNHCR standard target for vitamin A is 95 percent. Operations are urged to strategize to attain this target for vitamin A.

8. CHILDHOOD ILLNESS

The study assessed acute respiratory infection, fever and diarrhoea where parents or guardians were requested to provide explanations to the interview teams regarding the health status of the children. Presented below are the findings pertained to child illness;

8.1 Acute respiratory infection

Acute respiratory infection (ARI) was characterized by cough, difficult in breathing, running nose and flu. Parents or guardians were asked to explain the conditions of the children; where such signs related to acute respiratory infections were mentioned the child was recorded to had suffered from ARI. It was found that 26.3 percent of the children in Basateen were reported had ARI; 8.6 percent of them had ARI symptoms on the survey day. In Kharaz camp 22.2 percent of children were reported had signs of ARI within two weeks including survey day; 8.0 percent were reported had signs of ARI on the survey day. In the villages surrounding Kharaz camp 22.1 percent of the children were reported had signs of ARI within two weeks prior the survey including survey day. Sana'a had 21.3 percent of the children reported had signs of acute respiratory infections, of them 8.4 percent had signs of ARI on the survey day.

Table 11: Percentage of children aged 6.0 – 59.0 who had symptoms of acute respiratory infection on the survey day and two weeks preceding the survey

Camp	N	% of children had acute respiratory infection, aged 6.0 – 59.0 months	
		Yes today	Yes past 2 weeks
Kharaz	892	8.0	14.2
Basateen	894	8.6	17.7
Village's Kharaz	204	7.8	14.2
Sana'a	902	8.4	12.9
combined	2892	8.2	14.8

8.2 Diarrhoea

Parents or guardian were asked to explain different diseases that their children were suffering or felt sick of, if diarrhoea was mentioned, they were requested to explain in details the frequencies children have had loose motions in a complete day. During training of enumerators it was agreed that if the child passed 3 times loose motions, this child will be recorded as had diarrhoea.

In average 15.5 percent of the children were reported had diarrhoea 2 weeks prior the survey day and 8.1 percent reported had diarrhoea on the survey day. In Kharaz camp 16.3 percent were reported had signs of diarrhoea within two weeks preceded the survey day; in Basateen about 14.8 percent of the children had signs of diarrhoea two weeks prior the survey day. In Sana'a it was reported that 15.0 percent of the children had signs of diarrhoea two weeks before the survey day. Diarrhoea was more prevalent in Kharaz camp than in Basateen and Sana'a. About 15.7 percent of the children in the villages surrounding Kharaz camp had signs of diarrhoea two weeks before the survey. Table 12 illustrates

Diarrhoea can be acute and persistent this can result into severe dehydration with loss of trace elements, body weight and appetite to eat; causes malnutrition and death if not treated. Programs are advised to investigate causes of diarrhoea, design proper interventions to improve sanitary conditions in the camps, provision of adequate, clean and safe water to drink and food preparations. Improving personal hygiene through simple practices like washing hands with soap after using the latrines, before eating, and during food preparations may reduce watery diarrhoea disease.

Table 12: Percentage of children aged 6.0 – 59.0 with diarrhoea on the survey day and two weeks preceding the survey

		% of children had diarrhoea, aged 6.0 – 59.0 months	
Camp	N	Yes today	Yes past 2 weeks
Kharaz	892	9.1	16.3
Basateen	894	10.4	14.8
Village's Kharaz	204	5.9	15.7
Sana'a	902	7.1	15.0
combined	2892	8.1	15.5

8.3 Fever

In most cases fever is accompanied with elevation of children body temperature, it causes loss of appetite to eat, diseases such as malaria and dengue are associated with fever symptoms, depending with seasons these diseases affect communities in Yemen including refugees both in camps and urban situation. In Sana'a it was found that 9.9 percent of children were reported had fever on the day of survey and 17.1 percent were reported had fever signs in two weeks prior survey. In Basateen 19.0 percent were reported had fever two weeks prior the survey while 6.6 percent were reported had fever signs on the survey day. In the villages surrounding Kharaz camp 12.7 percent of the children were reported had fever signs within 2 weeks preceded the survey day whereas 3.4 percent had fever signs on the survey day. Overall across the survey sites 17.2 percent of the children were report had signs of fever two weeks prior the survey day. Table 13

Table 13: Percentage of children aged 6.0 – 59.0 who had fever symptoms on the survey day and two weeks preceding the survey

		% of children had fever, aged 6.0 – 59.0 months	
Camp	N	Yes today	Yes past 2 weeks
Kharaz	892	6.5	20.1
Basateen	894	6.6	19.0
Village's Kharaz	204	3.4	12.7
Sana'a	902	9.9	17.1
combined	2892	6.6	17.2

9. INFANT AND YOUNG CHILD FEEDING PRACTICES (IYCF)

Infant and young child feeding practices direct affect the health and nutritional status of the children under 2 years of age. Therefore protecting, promoting and supporting lactating women to breastfeed their children from 0 to 24 months of age is highly recommended. This survey assessed few selected IYCF standard indicators from FANTA 2007[5].

9.1 Women who have ever breastfed children

The results indicated that more than 86 percent of the women who were interviewed had ever breastfed children in their life. In Sana'a 92.9 percent of the interviewed women had breastfed there children while in Kharaz camp 86.8 percent of the interviewed women had breastfed children. Table 14 refers.

9.2 Breastfeeding the first 3 days consecutively without skipping

Breastfeeding infants consecutively within the first three days from delivery is encouraged as the infants receives colostrums, that contains antibodies and have high nutrient density. Early initiation of breast feeding ensures that the infant receives mother's warmth (kangaroo method is preferred and advocated). Breastfeeding hence raises affection bonding between mother and newly born infant. Immediate breastfeeding after delivery facilitates placental expulsion, uterine contraction and reduces the risk of post partum hemorrhage. In this study it was found that about 84.7 percent of the delivered women in Kharaz camp breastfed their infants consecutively within the first 3 days post delivery. In Sana'a it was found that 64.0 percent of the delivered women breastfed their infants consecutively within the first 3 days post delivery without skipping a day. Table 14 illustrates

Table 14 Percentage of good practices related to infant and young child feeding

No.	Good infant and young child feeding practices	Kharaz	Basateen	Kharaz villages	Sana'a
1	Ever breastfed a child	86.8	87.6	90.7	92.9
2	Giving of colostrums to infants – breastfeeding within 3 days after birth	84.7	71.6	88.2	64.0
3	Estimated percentage of infants given fluids before breastfeeding	63.3	63.2	54.4	50.0
4	Estimated percentage of women who were breastfeeding at the time of the survey	41.4	40.4	54.4	44.9

9.3 Practices of giving fluids to infants before breastfeeding

This study tried to assess the practices of mothers to give other type of fluids apart from breast milk to their infant's prior breastfeeding. The results indicate that in Kharaz camp about 63.3 percent of the mother would give their children other type of fluids to drink before they could start breastfeeding. In Basateen, 63.2 percent of the mothers would give their infants other type of fluids to drink prior breastfeeding them for the first time. The villages (54.4 percent) and Sana'a (50 percent) had lower percentages of women who would give their infants fluids for the first time prior breasting. These figures suggest the need to start implementing IYCF program in the refugee operation.

[5] FANTA; Generating indicators of appropriate feeding of children 6 through 23 months from the KPC 2000+; by Mary Arimond and Marie T. Ruel, November, 2003

9.4 Women breastfeeding at the time of the survey

On the survey day women were asked if were breastfeeding; it was found that in Sana'a about 44.9 percent of the surveyed women were breastfeeding on the survey day. In other locations the percentages of women breastfeeding on the survey days were 41.4 percent in Kharaz camp, 40.4 percent in Basateen and 54.4% in the villages.

Information on the initiation of breastfeeding was collected as appropriate feeding practices are age and time specific; age groups were created and defined within narrow age ranges[6]. A good practice in IYCF includes starting exclusive breastfeeding soon after delivery, followed by introducing semi solid at 5-6 and solid foods until when the child eats family meal. It was found that in Kharaz camp 87.2%, in Basateen 75.6%, in Sana'a 74.3% and in villages surrounding Kharaz camp 92.6 percent of the women initiated breastfeeding within an hour following their delivery. In average 82.4 percent of the women delivered were able to initiated breastfeeding within one hour post delivery across the survey locations. Table 15 refers.

Table 15 Percentage of lactating women initiated breastfeeding against specified time period

Survey location	% of post delivered women who initiated breastfeeding after birth						
	30 minutes	Within 1 hour	Total		>1 hour to 1day after birth	2 days after birth	Total
Kharaz camp	63.3	23.9	87.2		8.9	3.9	12.8
Basateen	45.1	30.5	75.6		16.7	7.7	24.4
Kharaz villages	63.2	29.4	92.6		5.9	1.5	7.4
Sanaa	51.2	23.0	74.3		13.3	12.4	25.7
Combined	55.7	26.7	82.4		11.2	6.4	17.6

9.5 Initiation of breastfeeding within an hour after delivery

In average about 17.6 percent of the delivered women were likely not to initiate breastfeeding within an hour after delivery. In Sana'a 25.7 percent, Basateen 24.4 percent, Kharaz camp 12.8 percent and 7.4 percent of the women were likely not to initiate breastfeeding within one hour post delivery.

9.6 Infants age women start giving other types of foods apart from breast milk

It was reported that about 11.8 percent of the women in the villages surrounding Kharaz camp would start giving other type of foods apart from breast milk at age 1-2 months. In Basateen about 3.2 percent of the women would start giving their infants other type of foods within 1-2 months after birth. In Sana'a about 7.1 percent of the women would start giving other types of food before completing their second month of age. In Kharaz about 4.4 percent of the women would start giving other type of foods to their infants at 1-2 months of age. At this age the stomachs of the infants are not strong enough to digest other types of foods apart from breast milk. The preparations of these "other" types of foods may result into diseases such diarrhoea. Breast milk is the preferred only best food during this period up to 6 months of age.

At age 3 to 4 months the number of infants who receive other type of foods increased. In Basateen it was 17.7 percent, in Kharaz camp was 15.8 percent, in Sana'a about 14.8 percent and in the rural villages was 12.7 percent of the women started giving other types of foods to their infants at age 3-4 months.

[6] FANTA: generating indicators of appropriate feeding of children 6 through 23 months from the KPC 2000+

Table 16 Percentage distribution of age infants started to eat other types of foods

Location	% of infants started to eat other type of foods by age in months			
	1 – 2 months	3 – 4 months	5 – 6 months	6 > months
Kharaz camp	4.4	15.8	32.4	47.4
Basateen	3.2	17.7	41.2	37.9
Kharaz villages	11.8	12.7	27.0	48.5
Sanaa	7.1	14.8	36.1	42.0
Combined	6.6	15.3	34.2	43.9

At the age of 5-6 months in Kharaz camp 32.4 percent of the women would start giving other type of foods to their infants; In Basateen 41.2 percent, in the villages surrounding Kharaz camp 27.0 percent and in Sana'a about 36.1 percent of the women would start giving other types of foods to their infants.

At above 6 months of age it was found that 37.9 percent of the women in Basateen would start giving their infants other type of foods, this is the lowest figure when compared to other locations. This is the age were almost all children should have started receiving complementary feeding from their families. While findings suggest that many women introduced other type of foods to their infants at an early age (1-2 months) there are also signs of delay of women in introducing other types of foods to their infants. Table 16 above illustrates

10. ESTIMATING ANAEMIA PREVALENCE (only conducted in Sana'a)

Anaemia is responsible for low haemoglobin levels in the affected population. Children under 5 years and women are the most at risk groups. The main signs include pallor of palms, easy fatigability, weakness and shortness of breath breath, increase hemorrhage risks, for pregnant women risks associated with child births, low birth weight babies and maternal deaths. To children anaemia is responsible for low cognitive development among infants and children[7]. This survey studied haemoglobin levels to both under 5 years and adult women of reproductive age.

Haemoglobin measurements were taken to children and women in Sana'a urban refugee programme. In Kharaz and Basateen this assessment took place through a separate survey conducted by a collaborative initiative between UNHCR and MENTOR.

10.1 Anaemia prevalence among children aged 6 – 59 months

The prevalence of anaemia among refugee children in the urban refugee program in the city of Sana'a was 44.3%. Severe anaemia prevalence was 3.4 percent, moderate anaemia was 24.5 percent and mild anaemia was 16.4%; according to WHO when the prevalence of anaemia is higher than 40% it is classified "severe"[8]. In this case refugee children in Sana'a are "severely" anaemic. Table 17

Table 17 Mean haemoglobin levels and prevalence of anaemia among women and children aged 6.0 – 59.0 months

Camps	N	Mean Hb	Severity of anaemia - %			
			Severe	Moderate	Mild	Total anaemia
Children	451	10.9	3.4	24.5	16.4	44.3
Women	451	11.2	1.1	19.3	10.4	30.8

Anaemia has several side effects to children including; decreased physical activity like playing, impaired cognitive development, decreased body immunity and hence makes children more susceptible to diseases like malaria, acute respiratory infections, diarrhea and measles which are the main causes of morbidity and mortality in emergencies[9]. The mean haemoglobin measurement level was 10.9.

Table 18 Mean haemoglobin levels and prevalence of anemia among children aged 6.0 – 59.0 months

Age group	N	Mean Hb	Severity of anaemia - %				
			severe	moderate	Mild	Total anemic	Normal
6.0 – 17.0	214	10.7	0.34	6.7	5.0	14.09	85.91
18.0 – 29.0	200	10.8	1.25	6.7	3.3	12.39	87.61
30.0 – 41.0	155	10.5	0.8	3.98	3.86	10.91	89.09
42.0 – 53.0	175	10.9	0.68	5.57	3.07	12.27	87.73
54.0 – 59.0	74	11.7	0.34	1.59	1.14	6.02	93.98

Findings indicated that anaemia was more common in children aged 6.0 – 17 months with 14.09 percent, followed by 18.0 – 29.0 months age group and 42.0 – 53.0 months age group. Table 18

[7] WHO: Management of severe acute malnutrition, 2001
[8] Iron Deficiency Anaemia; Assessment, Prevention and Control; A guide for programme managers; WHO/NHD/01.3, 2001
[9] UNHCR – Handbook for Emergencies, Third Edition, 2007

The association between fever, acute respiratory infection and diarrhoea with anaemia was analyzed. It was found that 24.09 percent of children with fever were likely to be anaemic, 15.34 percent of children with diarrhoea were likely to be anaemic and 19.43 percent of children with acute respiratory infection were likely to be anaemic.

Figure 4 Showing distribution of anaemia among children with fever, diarrhoea and ARI

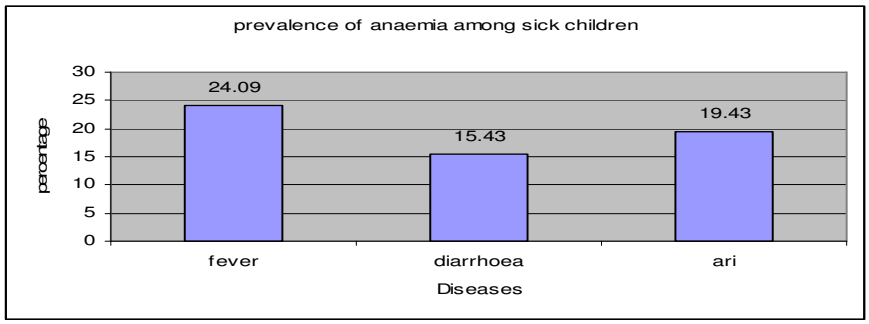


Table 19 Relationship between mean haemoglobin, prevalence of anaemia among children who had fever aged 6.0 – 59.0 months

Morbidity	N	Mean Hb	Severity of anaemia - %				
			severe	moderate	Mild	Total anemic	Normal
Fever	818	11.2	1.82	13.86	8.41	24.09	75.91
Diarrhoea	818	11.4	0.91	8.86	5.57	15.34	84.66
ARI	818	11.0	1.25	11.02	7.16	19.43	80.57

About 19.6 percent of anaemic children were likely to have fever, acute respiratory infection, and diarrhoea at the same time.

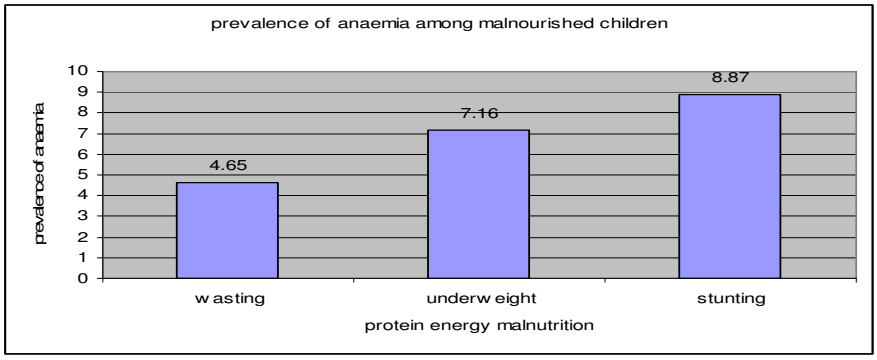
The association between anaemia and malnutrition indicated that about 4.65 percent of the wasted children were likely to be anaemic; 7.16 percent of the underweight children were likely to be anemic and 8.87 percent of the stunted children were likely to be anaemic. Table 19 illustrates

Table 20 Protein energy malnutrition, mean haemoglobin and prevalence of anaemia among children aged 6.0 – 59.0 months

Wasting	N	Mean Hb	Severity of anaemia - %				
			severe	moderate	Mild	Total anemic	Normal
Severe	12	11.2	0	0.45	0.45	0.90	99.10
Moderate	88	11.1	0	2.39	1.36	3.75	96.25
Normal	780	11.3	3.41	21.70	14.55	39.66	60.34
Underweight							
Severe	12	11.3	0.11	0.57	0.23	0.91	99.09
Moderate	88	11.2	0.11	3.75	2.39	6.25	93.75
Normal	780	11.6	3.18	20.23	13.75	37.16	62.84
Stunting							
Severe	12	11.4	0.23	1.25	0.34	1.82	98.18
Moderate	88	11.6	0.57	3.18	3.30	7.05	92.95
Normal	780	11.1	2.61	20.11	12.73	35.45	64.55

Anaemia among children under 5 years of age, the highest prevalence of anaemia occurs during the second year of life, due to low iron content in the diet and rapid growth during the first year.

Figure 5 Showing distribution of anaemia among malnourished children



10.2 Anaemia prevalence among adult women

Women at reproductive age in Sana'a had there haemoglobin levels measured. There physiologic status (pregnant, lactating and not pregnant or lactating) and age in years were recorded. The overall prevalence of anaemia among refugee women was 30.8 percent. Prevalence of anaemia among pregnant women was 6.97 percent; among lactating women was 11.37 percent and 12.35 percent women who were neither pregnant nor lactating. Table 21

Table 21 Mean haemoglobin, % severity of anaemia and physiology status among women

Age group	N	Mean Hb	Severity of anaemia			
			severe	moderate	mild	Total anaemia
Pregnant	149	11.3	0.49	5.26	1.22	6.97
Lactating	257	11.9	0.12	7.09	4.16	11.37
Normal	413	11.8	0.49	6.85	5.01	12.35
Combined	818	11.7	1.10	19.23	10.39	30.80

Prevalence of anaemia among women in different age groups varied from one group to another. About 13.57 percent of the aged 31-45 years were likely to be anemic while 8.07 percent of women aged 19-25 years were likely to be anaemic and 7.7 percent of the women aged 26-30 years were likely to be anaemic.

Table 22 Mean haemoglobin levels and prevalence of anemia among children aged 6.0 – 59.0 months

Age group	N	Mean Hb	Severity of anaemia			
			severe	moderate	mild	Total anaemia
12 – 18	15	11.5	0.12	0.86	0.24	1.22
19 – 25	221	11.2	0.37	5.5	2.2	8.07
26 – 30	211	11.3	0.12	5.38	2.2	7.70
31 – 45	360	10.7	0.49	7.46	5.62	13.57
46 – 60	11	11.5	0	0.12	0.12	0.24
Combined	818	11.5	1.1	19.32	10.39	30.8

Using the WHO classification on the severity of anaemia among the women at reproductive age, prevalence of anaemia falls in the "mild". Overall the prevalence of anaemia among women falls in the moderate category. Although the prevalence of pregnant women is in the mild category, research work have shown that very severe anaemia in pregnant women is a medical emergency due to the risk of congestive heart failure and maternal death rates are greatly increased. Table 23

23 Comparing prevalence of anaemia with WHO standards

Indicator	Standards	Pregnant women results	Lactating women results	Non Lac/non Pregnant
Normal	<= 4.9			
Mild	5.0 – 19.9	6.97	11.37	12.35
Moderate	20.0 – 39.9			
Severe	=> 40.0			

10.3 Prevention of anaemia in the community

UNHCR and WFP are committed to reduce current levels of micronutrient deficiencies in the refugee camps including anaemia. Programs that are implemented in order to prevent and reduce anaemia include;

- The health implementing partners are using the national malaria cases definitions and treatment protocols in the refugee camps for the clinical management of malaria cases
- UNHCR is planning to carry out a general distribution of long lasting impregnated bed nets to the refugee population. This will provide protective effects against mosquitoes; it is important prior distribution of these nets health education is provided to the refugees' population.
- Through the maternal and child health services, de-worming of children and pregnant women to prevent worm's infestation is carried out systematically.
- Pregnant women from second trimester who books in the antenatal care are provided with fansidar intermittently to prevent the mother and fetus against malaria during pregnancy period.
- Distributions of fortified wheat soy blend in the general food distribution, and ensure availability of micronutrient throughout the year round
- Promote, protect, and support breastfeeding, better care and feeding practices of young child
- Implementation of an environment health programme to control diseases out breaks that can cause anaemia
- Provision of multiple micronutrients tablets to pregnant women attending antenatal care
- Provision of iron and ferrous tablets to sick or anaemic individuals as per protocol
- Animal husbandry (goats) is being implemented in Kharaz camp at small extent helps to diversify the meals and getting some micronutrients.

11. Conclusion

As compared to 2008 the prevalence of global acute malnutrition remains stable. Underweight which is the result of both wasting and chronic malnutrition is on the serious situation according to WHO. Stunting which is chronic malnutrition indicates that the population is living in the food deficits situation for a long period. The prevalence of global acute malnutrition which falls within poor category as per WHO classifications is a result of several causes including; care and feeding of infants and young children, dietary diversity, water, health and hygiene environment, it is important to recognize that causes of malnutrition are multi factorials.

Micronutrient deficiencies have been recognized as one of the common problem in long standing protracted refugee operation. Addressing diet diversity, provision of fortified foods with adequate required micronutrients, addressing issues related to nutrients bioavailability and where possible provision of dark green fresh vegetables could help in reducing current levels of anaemia.

Implementing components of the child survival program jointly with MoH, UN agencies and the health implementing partners of UNHCR will make change toward improving the health and nutritional status of the refugees and nationals within the operation areas.

For the health system to function properly and realize the positive impact expected to deliver the stakeholders should holistically develop health determinants' factors inhibiting good performance in the refugee program, and develop innovative strategies which adequately integrate the range of public health disciplines; including health, nutrition food security, water, sanitation and HIV/AIDS.

The implementation strategies of the recommendations of this report are part of the comprehensive UNHCR / WFP Joint Assessment Mission, and the Malaria and Anaemia survey which the refugee operation have had in Yemen during the months of April – June 2009. The recommendations from these surveys and the JAM assessment will be holistically reviewed to form some basis and justifications to soliciting projects resources henceforth improve provision of services and assistance to the beneficiaries of the program.

12. Recommendations

These recommendations are made in line with the findings related to the actual camp based situation:

Immediate recommendations

1. The health and nutrition project has expanded and has a lot of pleas, it is advised systematically UNHCR in close coordination with MoH should take lead to call for health / nutrition /HIV /AIDS technical and management coordination meeting on bi-monthly basis chaired by the MoH (Lahji, Aden governorates) to discuss implementation arrangements, achievements and constraints of planned activities. Stakeholders from Sana'a should be invited to attend this meeting.
2. Given the fact that the current prevalence of global acute malnutrition in all locations posses a worrisome situation, it is recommended that an exhaustive nutrition screening of children under 5 years using mid upper arm circumferences be organized where feeding programs are implemented; admit all malnourished children in their respective feeding programme based on admission criteria.
3. There has been one technical training on community based management of severely malnourished children has been conducted and attended by health and nutrition staff working in the refugee operations. It is recommended that training be organized to build the capacity of staff who will work in the nutrition programme. The nutrition programme should use standard feeding protocols across the operation and staff should be oriented in using the protocols.
4. Once the training on community based management of severely malnourished children is completed it will be more advantageous to the programme to implement the complete package of the community based management of malnourished children.
5. UNHCR in close coordination with MoH, UNICEF, WHO and the governorate health management teams of Lahjj and Aden should ensure that all eligible new arrival refugee children are vaccinated and given vitamin A supplementation prior entering the camps or joining the urban refugee programmes.
6. Since the immunization programme emphasizes on proper documentations for monitoring and evaluations purposes, it is recommended that MCH cards / growth monitoring cards should be issued to all children also refresher training to all vaccinators should be undertaken concentrating on recording, proper keeping and administration of vaccinations.

Long term recommendations

1. Results from this survey suggest that community practices on issues related to infant and young child feeding have some gaps in the community; it is recommended a comprehensive IYCF project be implemented targeting pregnant and lactating women, infants and children from age 0 to 2 years. The project should emphasize on maternal nutrition, exclusive breastfeeding and child care. The High Commissioner Special Project Funds supports such programs.
2. Given the fact that women refugees' in the urban programs work outside their families to earn some income to support their families; it is recommended that both community and institutions managed kinder garden be supported with school feeding programme.
3. In close coordination with WFP (VAM unit), UNHCR community services should organise and conduct a systematic assessment to identify vulnerable families that will be enrolled in the food voucher system currently; systematic admission and discharging criteria of families from the food voucher system should be developed and implemented.
4. UNHCR jointly with WFP and UNICEF should strategize in order to improve the quality and quantity of the food basket refugees receive in terms on micronutrients; provision of micronutrient supplements using methods like sprinkles, monitoring on compliance of ANC women if are swallowing multiple micronutrients given during their visits.

13. Reference

1. UNHCR's Public Health High Commissioner Special Project: Progress update 2007 – 2008; February 2009

2. 2008 UNHCR Annual Health Information System report, UNHCR Yemen

3. WHO manual for health workers on child illness in emergencies for humanitarian workers; 2008, Geneva

4. The State of the world's children 2008; child survival, unite for children; UNICEF December 2007 and Demographic health survey – for Yemen

5. FANTA; Generating indicators of appropriate feeding of children 6 through 23 months from the KPC 2000+; by Mary Arimond and Marie T. Ruel, November, 2003

6. FANTA: generating indicators of appropriate feeding of children 6 through 23 months from the KPC 2000+

7. WHO: Management of severe acute malnutrition, 2001

8. Iron Deficiency Anaemia; Assessment, Prevention and Control; A guide for programme managers; WHO/NHD/01.3, 2001

9. UNHCR – Handbook for Emergencies, Third Edition, 2007

14. Appendixes 1

Result Tables for WHO standards 2006

Table 20: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 2859	**Boys** n = 1447	**Girls** n = 1412
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(267) 9.3 % (8.1 - 10.8 95% C.I.)	(152) 10.5 % (8.6 - 12.7 95% C.I.)	(115) 8.1 % (6.8 - 9.8 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(228) 8.0 % (7.0 - 9.1 95% C.I.)	(134) 9.3 % (7.8 - 11.0 95% C.I.)	(94) 6.7 % (5.6 - 7.9 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(39) 1.4 % (0.9 - 2.0 95% C.I.)	(18) 1.2 % (0.7 - 2.3 95% C.I.)	(21) 1.5 % (0.9 - 2.6 95% C.I.)

The prevalence of oedema is 0.0 %

Table 21: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mths)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	672	5	0.7	54	8.0	613	91.2	0	0.0
18-29	671	6	0.9	38	5.7	627	93.4	0	0.0
30-41	525	7	1.3	41	7.8	477	90.9	0	0.0
42-53	546	7	1.3	46	8.4	493	90.3	0	0.0
54-59	295	10	3.4	35	11.9	250	84.7	0	0.0
Total	2709	35	1.3	214	7.9	2460	90.8	0	0.0

Table 22: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 55 (1.9 %)	Not severely malnourished No. 2837 (98.1 %)

Table 23: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 2728	Boys n = 1396	Girls n = 1332
Prevalence of underweight (<-2 z-score)	(374) 13.7 % (12.1 - 15.5 95% C.I.)	(219) 15.7 % (13.5 - 18.1 95% C.I.)	(155) 11.6 % (9.5 - 14.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(335) 12.3 % (10.8 - 13.9 95% C.I.)	(196) 14.0 % (12.0 - 16.4 95% C.I.)	(139) 10.4 % (8.6 - 12.6 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(39) 1.4 % (0.9 - 2.2 95% C.I.)	(23) 1.6 % (1.0 - 2.6 95% C.I.)	(16) 1.2 % (0.6 - 2.4 95% C.I.)

Table 24: Prevalence of underweight by age based on weight-for-height z-scores and oedema

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mths)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	675	5	0.7	54	8.0	616	91.3	0	0.0
18-29	672	11	1.6	62	9.2	599	89.1	0	0.0
30-41	530	9	1.7	74	14.0	447	84.3	0	0.0
42-53	552	8	1.4	79	14.3	465	84.2	0	0.0
54-59	299	6	2.0	66	22.1	227	75.9	0	0.0
Total	2728	39	1.4	335	12.3	2354	86.3	0	0.0

Table 25: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 2664	Boys n = 1362	Girls n = 1302
Prevalence of stunting (<-2 z-score)	(669) 25.1 % (22.6 - 27.8 95% C.I.)	(390) 28.6 % (25.5 - 32.0 95% C.I.)	(279) 21.4 % (18.5 - 24.7 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(482) 18.1 % (16.1 - 20.3 95% C.I.)	(273) 20.0 % (17.7 - 22.6 95% C.I.)	(209) 16.1 % (13.3 - 19.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(187) 7.0 % (5.9 - 8.4 95% C.I.)	(117) 8.6 % (6.8 - 10.9 95% C.I.)	(70) 5.4 % (4.4 - 6.6 95% C.I.)

Table 26: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mths)	Total no.	No.	%	No.	%	No.	%
6-17	651	27	4.1	83	12.7	541	83.1
18-29	649	71	10.9	157	24.2	421	64.9
30-41	514	46	8.9	103	20.0	365	71.0
42-53	551	29	5.3	102	18.5	420	76.2
54-59	299	14	4.7	37	12.4	248	82.9
Total	2664	187	7.0	482	18.1	1995	74.9

Table 27: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	2859	-0.44±1.18	1.44	0	33
Weight-for-Age	2728	-0.86±1.03	1.60	153	11
Height-for-Age	2664	-1.10±1.25	2.21	153	75

* contains for WHZ and WAZ the children with edema.

Figure 6: Distribution of wasting compared to NCHS reference1997 values by sex

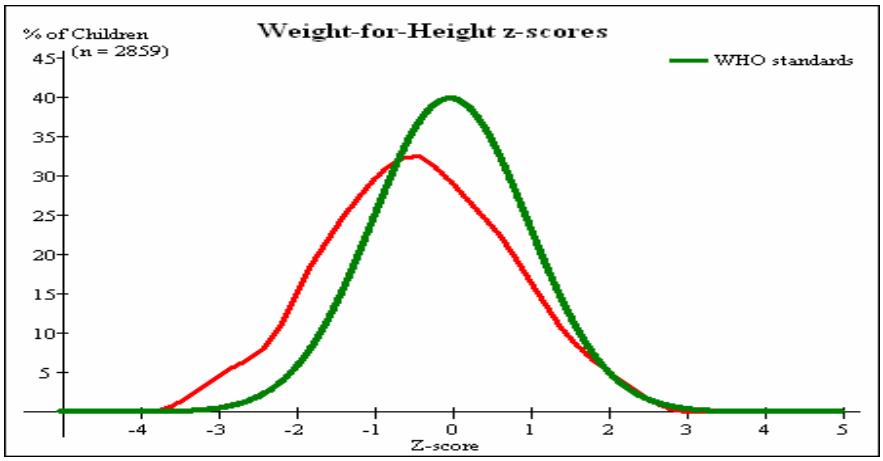


Figure 7: Distribution of stunting compared to NCHS reference1997 values by sex

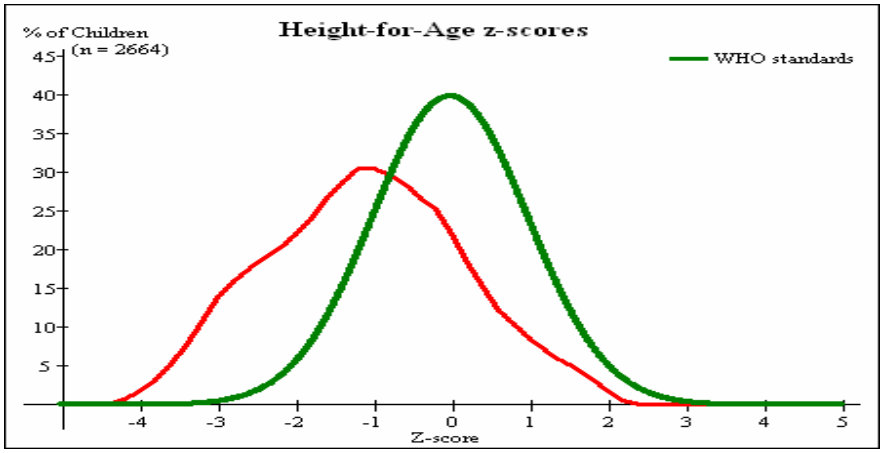


Figure 8: Distribution of underweight compared to NCHS reference1997 values by sex

Acknowledgement

I am grateful for the tremendous support that was constantly rendered by many colleagues for this survey to be accomplished as it was planned. The UNHCR colleagues in the Field Office Kharaz, Sub Office Aden for a well coordinated support provided in terms of logistics, administration, funding processing and provision of security assistance during the two months this work was conducted. The Representation Office in Sana'a played a key role both internal and external coordination. Special thanks go to UNICEF office in Aden for the materials and human resource support provided to this work. I sincerely appreciate the valuable support from the Health and Nutrition implementing partners of UNHCR, refugees especially the children under 5 years, women and refugee leaders who were very willing in participating in this survey. Many thanks go to the Ministry of Health for approving this study to take place.

I further accord abundant appreciation to the following government institution and non government organizations

1. Ministry of Health (MoH)
2. Charitable Society for Social Welfare (CSSW)
3. Integration Development Foundation (IDF)
4. United Nations Department of Safety and Security (UNDSS)

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Funding support
1. High Commissioner's special fund on nutrition project, UNHCR Geneva

Lastly special appreciations go to Ms. Claire Bourgeois, the Representative in Yemen and Mr. Yocoub El Hillo, the Representative in Tanzania for their coordination with the UNHCR Public Health and HIV/AIDS section in Geneva for allowing me to undertake this important function.