ADDIS ABABA UNIVERSITY

FACULTY OF MEDICINE, SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF MALNUTRITION AND ANAEMIA AND THEIR DETERMINANTS AMONG REFUGEE PRE-SCHOOL CHILDREN IN KEBRIBEYAH REFUGEE CAMP, SOMALI REGION, ETHIOPIA

CROSS-SECTIONAL STUDY WITH ANALYTIC COMPONENT

BY: YASIN JEMAL YASIN (BSc)

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ADVISOR: Dr. JEMAL HAIDAR (MD, MSc, DRM)

ASSOCIATE PROFESSOR

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APPROVED BY EXAMINING BOARD

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Examiner

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ABSTRACT

Background: Malnutrition and anemia remain one of the most common causes of morbidity and mortality among children throughout the world. Both malnutrition and anemia are important health problems affecting preschool children and pregnant women. Refugee children, due to their living condition, are the most vulnerable to suffer from these problems. Surveys in the refugee camps have shown that the prevalence of malnutrition and anaemia in the refugee camps were high. However, underlying variations of these nutritional indicators and determinant factors among refugee camps were poorly understood.

Objective: The main objective of this study was to assess malnutrition and anemia and identify the various causes and determinants and their relative contributions in refugee settings.

Methodology: Cross -sectional study with analytic component was conducted in Kebribayah refugee camp on a total of 671 refugee children aged between 6 and 59 months during the month of March 2010. Simple random sampling method was employed to collect quantitative data using structured questionnaire consisting of socio-demographic characteristics, child related variables, maternal/care takers characteristics, environmental health conditions, anthropometric and hemoglobin measurements. The study groups were drawn using random table number to select the sampled households from the roaster. Data were entered using EPI-INFO software (version 3.5.1.) and exported into SPSS for analysis. NCHS/WHO reference population and standard was used to convert height and weight measurements into nutritional indices. Bivariate and multivariate logistic regression analysis were utilized to identify the factors associated with under-nutrition and anaemia.

Results: Overall, the prevalence of stunting, underweight and wasting were 27.6%, 26.1% and 8.9% respectively. While the prevalence of severe stunting, underweight and wasting was 9.5%, 4.8% and 2.5% respectively. The prevalence of anaemia was 52.4% and the magnitude of severe anaemia was 10.5%. The main determinant factors of stunting were child age, maternal illiteracy, paternal lack of education, and family size. Child sex, age, maternal lack of education, childhood illness such as diarrhea and ARI, and lack availability of toilet facility were associated with underweight. Age of child, sharing and selling of food ration, duration of ration lasting, presence of ARI and poor personal hygiene (number of baths took) were the most important determinants of wasting. The most determinant factors of anaemia were child age, lack of maternal and paternal education, number of under five children in the HH, duration of ration lasting, sharing and selling part of the ration, presence of diarrhea, stunting and underweight.

Conclusion and recommendations: The study indicates that underweight is serious in the area according to the WHO classification, and chronic nutritional problem is also of particular concern. The study also shows that anaemia was highly prevalent in the area and was categorized as severe, compared to the WHO classification. Overall, the state of nutrition was better in the area than other surveys but anaemia was highly prevalent and severe in the study area. Actions targeting early child illness treatment are necessary to improve the nutritional status of the children. In addition, it is advisable to consider fortified food ration with iron for the community.

ACRONYMS

ANC	Ante Natal Care
ARI	Acute Respiratory Illness
ARRA	Administration for Refugee and Returnee Affairs
BMI	Body Mass Index
CDC	Centre for Disease Control and prevention
CI	Confidence Interval
FP	Family Planning
H/A	Height-for-age
HAZ	Height for age Z score
Hb	Hemoglobin
HH	House Hold
MUAC	Mid-upper Arm Circumference
NCHS	National Centre for Health Statistics
OR	Odds Ratio
AOR	Adjusted Odds Ratio
PEM	Protein-Energy Malnutrition
PSC	Pre-School Children
SD	Standard Deviation
SFP	Supplementary Feeding Program
TFP	Therapeutic Feeding Program
UNFPA	United Nations Fund Population Agency
UNHCR	United Nations Higher Commissioner for Refugees
UNICEF	United Nations Children's Fund
W/A	Weight-for-Age
WAZ	Weight for Age Z score
WFP	World Food Program
W/H	Weight-for-Height
WHZ	Weight for Height Z score
WHO	World Health Organization

1. INTRODUCTION

1.1. BACKGROUND

Malnutrition and anemia remain one of the most common causes of morbidity and mortality among children throughout the world (1-3). Malnutrition makes a substantial contribution to excess mortality rates, both directly (i.e., people dying due to malnutrition), and indirectly (via a synergism with other diseases), for 60% of the 10.9 million deaths annually among under five children (4-6). Over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life, when mortality is highest (5-6).

Micronutrient deficiencies contribute about 7.3% of the total global burden of diseases. Deficiencies, particularly of iron, vitamin A and iodine are frequently the major public health threat, and are the main forms of micronutrient malnutrition which, together, affect more than 4.5 billion people worldwide (7-10).

Anemia is a global public health problem that affects populations in both rich and poor countries with major consequences for human health as well as social and economic development. It occurs at all age groups, but is more prevalent in pregnant women and young children (11-12). It is estimated to affect more than 2 billion individuals' worldwide (one in three children). According to the WHO review of nationally representative surveys from 1993 to 2005, 47% of preschool children worldwide have anemia (7, 11, 13-14).

1.2. STATEMENT OF THE PROBLEM

Nutritional status of an individual impacts on his/her health, physical status and mental development and productivity. The impact of nutritional status on health is profound and clearly known. As the rate of malnutrition increases, the risk of disease and death is eminent. The reduction in both macro- and micronutrients lead to weakening of the immune system. This predisposes the vulnerable groups to infections, reduced appetite and lowering absorption of nutrients, and becomes a cyclical or recurring process which links malnutrition with other communicable diseases or vise versa (14-15).

Most of the surveys conducted on refugee children are anthropometric measurements which are descriptive in nature and are limited to analyze the association between nutritional status and related variables, and does not usually show the relative contribution of different factors for the nutritional status of these vulnerable groups of the population. In addition, very limited researches have been conducted to assess the degree of micronutrient deficiencies and

systematically evaluate interventions to reduce micronutrient deficiencies in refugee population (16-18).

Although there is evidence of malnutrition including micronutrient deficiencies in refugee camps, and ongoing nutrition programs, a relatively little information has been published on most prevalent deficiencies (19).

While there is ongoing nutrition programme and a follow up survey assessment conducted in the study area, still the degree of malnutrition and anemia and their determinant factors are not clearly identified and documented. Therefore, this study is proposed to explore the degree of malnutrition and anemia, and their determinant factors in the Kebribeyah refugee camp.

1.3. SIGNIFICANCE/ RATIONALE OF THE STUDY

There is no information that clearly shows the determinant factors of malnutrition and anemia among the refugees that can be used for proper priority setting and effective interventions. Thus, this study will try to address the existing gaps for future refugee program improvement.

2. LITERATURE REVIEW

2.1 GLOBAL SCENE OF REFUGEES

Instability in many parts of the world has led to massive displacement of civilian communities across international and regional boundaries with associated shortage of basic services (food, water, shelter, and health services) often leading to higher incidence of morbidity and mortality (4, 20). Most of the refugees are currently dependent on international aid assistance for their survival and the most frequent causes for forced mass population movement are conflict and famine (12, 21). The peoples need in emergencies is not only to prevent starvation but also to stay alive, and to maintain physiological and mental growth and to allow for recuperation of past malnutrition (22).

According the United Nations Higher Commission for Refugees (UNHCR) statistical data, the number of refugees at the end of 2007 stood at 11.4 million including 1.7 million people considered to be in refugee like situations. Developing countries hosted 82% of the global refugee population; showing human displacement is large and growing in complexity with children and adolescents representing the major segment of the population in Africa and Asia. By the end of 2007, Asia hosted the r 55% of the refugees while Africa and Europe 22% and 14% respectively (23).

Ethiopia currently hosts about 110,806 refugees from 14 different countries in 12 camps. The majority of the refugees are from Somalia, Eritrea, Sudan and Kenya. Somalia refugees constitutes about 39.6% of the population, while those from Eritrea, Sudan, Kenya and others make up 32.9%, 23.5%, 2.6% and 1.5% respectively. The conflicts in these aforementioned counties have led to the influx of refugees into Ethiopia for nearly two decades (24-25).

2.2. GLOBAL OVERVIEW/SCALE OF MALNUTRITION

Nutritional status is an important global indicator of development at national and international levels. Child malnutrition is the best indicator of monitoring progress towards MDGs. Underweight prevalence among under five children is the indicator used to measure the progress towards the MDG target. The target is to reduce by half the proportion of children (0 - 59) who suffered hunger, or fall below -2 SD from the median weight for age of the standard reference population (12, 14-15).

Nutrition plays a major role in the survival, growth and development of young children. The effects of poor nutrition, in all its forms, impact negatively upon the social, economic and

cultural development of societies and nations (15, 26). It will be very unlikely to achieve many of the Millennium Development Goals (MDGs) which includes the goals on extreme poverty and hunger reduction, primary education, gender equality, reduce child mortality, improve maternal health, and combating HIV/AIDS, malaria and other diseases, if under nutrition cannot be reduced and prevented as they are directly linked with nutrition (12, 14, 15, 27).

It is evident that nutritional status of individuals is of fundamental importance to maintain health and good physical status and mental development and productivity and it is the basis of human development. Child malnutrition as poverty indicator is a general indicator which is reflective and indicative of other desirable outcomes of development such as improvement in gender equality and empowerment, intra-household distribution and equality, and health environment quality (15, 26, 28-30).

Malnutrition is a multifaceted problem and its long – term consequence is multifarious. It has a devastating effect on the physical well being, social, economic and cultural development of societies and nations. It is both the consequence and cause of poverty meaning that income poverty and inadequate food consumption are firmly linked. As a result, malnutrition leads to poverty through direct losses in productivity by increasing sick days, and decreasing work force, indirectly losses from poor cognitive function, poor child development and deficits in schooling and losses due to increased health costs and its effect will entrenched to the next generation (27).

Anemia impairs physical and cognitive development causing learning deficits, eating disorders and poor growth in children and also affects the immune system. During pregnancy it has huge implications on the mother and infant, with increased risk of hemorrhage, sepsis, maternal mortality, perinatal mortality, premature births, intrauterine growth retardation and low birth weight. A literature review from 1973 to 1981 found a 10% increase in hemoglobin levels associated with a 10 to 20% increase in work output. Adults with anaemia are less likely to engage in social activities and less likely to nurture and care for their infants and children (26, 31).

To tackle malnutrition, integration of nutrition with health and other services is very essential, because it entails comprehensive and holistic approach, incorporating biological and social determinants, through involvement of international aid organizations, host governments and refugee communities particularly women and children (14).

Nutrition and health are two sides of the same coin and are, inseparable. While good health is the outcome of nutrition, nutrition is a vital component of health. Good nutrition is the cornerstone and fundamental for positive health, successful economic and social development, survival,

functional efficiency and productivity for current and succeeding generation. Well nourished children perform better in school, grow into healthy adults and have better resistance to infection, and are able to give their own children a better life (15, 28).

On the other hand, undernourished children have lowered resistance to infection and are more likely to die from common childhood ailments like diarrheal diseases and respiratory infections. Sometimes the victims suffer from repeated illness which lowers their nutritional status and may go into a vicious cycle of recurring sickness and faltering growth, often with irreversible damage to their cognitive and social development (14-15). The difficulty of malnutrition is mostly invisible. The three- fourth of the children who die from causes related to malnutrition were only mildly or moderately undernourished, without showing sign of their vulnerability.

The trend of malnutrition in developing world remained fairly constant from 1990-1992 to 2000-2002, affecting 17 – 20% of the total population. The pattern of malnutrition in Asia and Africa is quite different from the rest of the world. In Asia where the vast majority of the undernourished people live (60% of the total) and Africa (28%), the prevalence of malnutrition has decreased very little over the last decade by 4% in Asia and 3% in sub-Saharan Africa (22, 32).

In Africa, although the prevalence of stunting likewise declined, from 40.5 percent in 1980 to 35.2 percent in 2000, the absolute number of stunted children increased by more than one –third over the period meaning that only 0.26% reduction per year. Within Africa the highest rate of stunting is found in eastern Africa, where on average, 48% of preschool children are affected and the absolute figure of underweight in this region has increased mainly due to declines in agricultural productivity, repeated food crises associated with drought and conflict, high levels of poverty and HIV/AIDS (32).

Globally, there has been a moderate reduction in child malnutrition during the decade 1990 – 2000, with the prevalence of underweight declining from 26.5 % to 22.4 %. Africa, however experienced almost no change; the proportion of children under five who were underweight remained about a quarter while the absolute number increased from 26 to 32 million (7). While a considerable improvement in child malnutrition is achieved in other regions of the world, the share of the total number of undernourished children is increasing in sub Saharan Africa, especially in the Horn and Eastern Africa and this indicates that there is a paradigm shift in malnutrition in this region (2, 32). In other way round, the increase in the number of undernourished children in Africa also reflects a rapid rate of population growth but the share of

HIV/AIDS in the second half of the decade also made a significant contribution and reverses some of the gains made in the early years.

2.3. CAUSES OF MALNUTRITION

The causes of malnutrition vary widely by area, ethnic group, livelihood/ecological zone, but there is some notable uniformity. Recognizing the pervasive nature of malnutrition and the relevance of its complex relationship with communicable disease is important in order to develop comprehensive and effective health strategies for societies. Thus identifying and understanding these causes is clearly important to develop policies and programs to address the problem of under-nutrition (4, 26, 33).

The causes of malnutrition are multiple and complex. These causes are intertwined with each other and are hierarchically related (15, 18, 34). These causes are far broader than availability of food.

2.3.1. **Immediate (proximate) causes**: The most immediate (or proximate) determinants of malnutrition are poor diet and illness, operating in a synergistic fashion with infections are more common in those malnourished and negatively impact growth. They are caused by a set of underlying factors and operate at individual level (35, 36). Food shortage and nutritional problems are well known problems among refugees and the proximate cause of mortality in emergencies is disease, especially measles, and diarrhea such as cholera and typhoid (22, 26).

2.3.2. Underlying causes: The three primary underlying causes of malnutrition (poor diet and infection) are household poor access to food, inadequate maternal and child care practices (access to health), and unsafe environment/ poor sanitation. Each of these three clusters of factors operating at household and community level are essentials but alone insufficient for achieving nutrition insecurity (26, 35, 36).

2.3.3. Basic causes: The basic causes which operate at societal and national level include socio –economic, cultural, traditional beliefs, customs, and political condition. Gender roles and lack of education among women are also both critically important indirect cause of malnutrition. In other words, the distribution of wealth, income, political power is the ultimate cause of malnutrition (See Annex 1, Fig 5) (26, 35, 36).

Malnutrition due to deficiency of essential nutrients and over nutrition is closely correlated and exacerbated by social and economic disparities. In Africa particularly in sub- Saharan Africa, extreme poverty, poor access to health care services, poor children caring practices, low education level, lack of good governance, conflict and natural disasters are among the main and prevalent causes that worsen the situation of malnutrition (21).

2.4. CAUSES OF ANAEMIA

The causes of anemia are similar with the causes of malnutrition (immediate, underlying and basic causes), which varies from place to place and among population groups. It is the result of a wide variety of causes such as iron deficiency, acute and chronic infections (malaria, cancer, tuberculosis, and HIV), parasitic infection (hook worms, ascaris and schistosomiasis), nutritional deficiencies (vitamin A and B12, folate, riboflavin, and copper which in turn caused by inadequate/ low consumption of meat, fish, and poultry), heavy blood loss (menstruation), and others. However; the primary cause of anemia is iron deficiency which contributes 50% of anemia cases. Iron deficiency itself is caused by a number of other factors. The main risk factors for IDA include: low intake of iron, poor absorption of iron from diets in phytate or phenolic compounds and a period of life when iron requirements are especially high such as during growth and pregnancy (11, 13,26, 31).

2.5. MALNUTRITION IN THE REFUGEES

In refugees malnutrition runs, rampant exponentially and the burden is high in refugee living in Africa and Asia by various circumstances including civil conflicts, poor infrastructure, limited resources (funding shortage), inadequate and fragmented health services and the high burden of communicable disease, including the HIV/AIDS pandemic, malaria and tuberculosis (21, 37-38). In sub Saharan Africa, the extreme vulnerability of refugee children for malnutrition and micronutrient deficiencies is clearly critical and high due to lack of specialized nutrition services. It is aggravated by confusion surrounding health entitlements and lack of other specialized services needed by displaced individuals (21). In refugee camps of sub-Saharan Africa, malnutrition rate is among the highest in the world. Studies showed that the prevalence of malnutrition and anemia is high in refugee camps. A study conducted in the Kakuma Refugee camp in Kenya, revealed a prevalence of 17.2 % of acute malnutrition and 61.3 % anemia in children aged 6 - 59 months (12, 21).

A cross -sectional study conducted (2003) on nutritional status and anemia in Burmese refugee camp showed that 5.7% wasting and 45.7% stunting and the rate of iron deficiency (ID), anemia and iron deficiency anemia (IDA) were 85.4% , 72% and 64.9% respectively (17). Another study done (2004), in Osire refugee camp, Namibia showed 45% underweight, 41% stunted and 8 % were wasted (39). Cross sectional study conducted (2007) in southern Sudan also showed that the prevalence of underweight, stunting and wasting were 48%, 45% and 22% respectively (33). UNHCR annual report (2008) on public health and HIV also showed that anemia rate in Dadaad camp, in Kenya and Nayapara and Kutupalong camps in Bangladesh was 72% and 47.5% among refugee preschool children respectively (37). Another study done(2005) of

protracted refugee situations in North and East Africa found high levels of ID (ranging from 23% to 75%) and anaemia rate ranging from 12.8% up to 72.9% (but greater than 60% in three of five camps) in children among the different camps (19).

In Ethiopia, the burden of malnutrition and anemia among refugee are high due to various circumstances. Study conducted in (2008) in Fugnido refugee camp, revealed a prevalence rate of GAM of 11.2-12.3%, and prevalence of anemia was 38.6%. Similar study (2008) in Shimelba and Teferiber refugee camps also showed 8.5% and 9% prevalence of GAM and 36% and 35.6% prevalence of anemia (40).

2.6. MEASURING MALNUTRITION

The different studies conducted in nutrition amongst refugee populations have used anthropometric measurements in well coordinated cross sectional surveys among the preschool children. They are often used for estimating the nutritional status by calculating the magnitude of malnutrition and are considered as simple and easy means of collecting data (28, 34, 41).
Anthropometry is the use of body measurements in the assessment of nutritional well being. They are strong and feasible predictors at individual and community level of frequent ill health, functional impairment and/or mortality. They are considered as proxies of an individual's nutritional status. They are mostly employed in large sample sizes and help to determine the extent and severity of malnutrition for purpose of instituting appropriate intervention and to identify target groups of the population. The most frequently used anthropometric parameters are four; weight, height, age and sex of each person, that enables to calculate the nutritional indices (See Annex 2 and 3) (26, 28, 34, 40, 41).

2.7. MEASURING/ASSESSING ANAEMIA

2.7.1. Hemoglobin measurement: Estimates of hemoglobin are commonly included in nutrition surveys of children. The prevalence of anaemia in a population is best determined by using a reliable method of measuring hemoglobin concentration. Hemoglobin level measured by HemoCue Hb201^{+} analyser provides determination of haemoglobin quickly, easily, and with lab quality result. The presence and severity of anemia will be diagnosed using the age-based Hemoglobin (Hb) criteria for children aged 6 -60 months old designated by WHO (See Annex 4) (31, 40).

2.7.2. Pallor: In addition to hemoglobin measurement, clinical screening for pallor is one of the most common methods of screening for anemia. Pallor is used as a screening tool to identify and determine anemia by examining the paleness of several different areas, such as the face, nail beds, tongue, palms, conjunctivae (inner lower eyelids) and other body parts (31, 43).

3. OBJECTIVE

3.1. General Objective: To assess the magnitude of malnutrition and anemia and their determinants among refugee preschool children in Kebribeyah Refugee Camp, Somali Region, Ethiopia.

3.2. Specific Objectives:

- To determine the prevalence of malnutrition among refugee preschool children using anthropometric measurement,
- To determine the prevalence of anemia by measuring hemoglobin,
- To identify the possible determinants for acquiring malnutrition and anemia in the camp.

4. RESEARCH METHODOLOGY

4.1. Study Area and Period: This study was conducted in Kebribeyah Refugee camp, Somalia region, South Eastern Ethiopia during March, 2010.

Kebribeyah is a refugee camp established in 1991 (after the fall of Ziad Barre's regime) in region 5 (Somalia region), Ethiopia. It is found in the south eastern part of Ethiopia, approximately 685km from the capital city, Addis Ababa. Currently it is one of the 12 camps found in Ethiopia. According to the Administration for Refugee and Returnee Affairs (ARRA) refugee statistics, there are about 16,354 refugees residing currently in the camp. Of these, 8355 (51.1%) are women and 7999 (48.9%) are men, as of 30 June 2009. About 3272 (20%) are under 5 years of age, and women constitute 1672 (51.1%) and the rest are men 1600 (48.9%) (24, 44). The camp is located in the town of Kebribeyah. The majority of the refugees' settlers have been in the camp for 18 years (44).

4.2. Study Design: This study is a cross- sectional study with analytic component.

4.3. Source population: All refugee preschool children living in Kebribeyah Refugee camp.

4.4. Study population: Children who were resident in the camp during the time of the survey aged 6 – 59 months who have parents/care takers. This age group is chosen because they are sensitive and reflect the nutritional problem in the community. The families/caretakers of these subjects were participated in the interview to complete the questionnaire.

Inclusion and exclusion criteria: Those households with under five children who were living in the camp during the time of the survey, and that have families/caretakers who are mentally and physically capable of being interviewed. Households that didn't fulfill the inclusion criteria were excluded.

4.5. Sampling Method and Sample Size:

4.5.1. Sampling Method:

Representative sample was selected among the source population. Since the geographical organization of the camp is in proximity, it was possible to visit all the households with preschool children and had equal chances of being surveyed. Therefore; simple random sampling using random table was used to select the sampled households from a roster or sampling frame with preschool children. And only one child was engaged from each HH. When more than one child was obtained in the HH, only one child was selected by lottery method by numerators to reduce the redundancy of information given by HHs.

4.5.2. Sample size:

The sample size was estimated based on two assumptions. The first assumption was to consider a prevalence of underweight of 47% using a single proportion formula ($n = z^2 * (p \times q) / d^2$) where n is sample size, z= 1.96 for an error risk of 5%, p= expected underweight prevalence as a factor, q= 1- expected number of nourished children as a fraction of 1, d= absolute precision factor.

The second assumption was based on the prevalence of anemia of 36% based on the same formula p= expected anemia prevalence as a factor of 1; q=1- expected number of non-anemic children as a fraction of 1; d= absolute precision factor}.

Using the above information with a 95% confidence level and a precision of 3%, the following sample sizes are obtained (Table 1).

Table 1: sample size estimation

Nutritional problem	Prevalence (%)	Precision (%)	Confidence Limit (CL)	Required sample size
Underweight	47	3	95%	1063
Anemia	36	3	95%	983

Since 1063 households include the 983 households, 1063 households were taken. But the total number of households is less than 5000 and it requires finite population correction.

$$\frac{n}{1 + (n / N)} = \frac{1063}{1 + (1063/ 1791)} = 667 \text{ HHs}$$

Where, n = sample size
N = total number of households

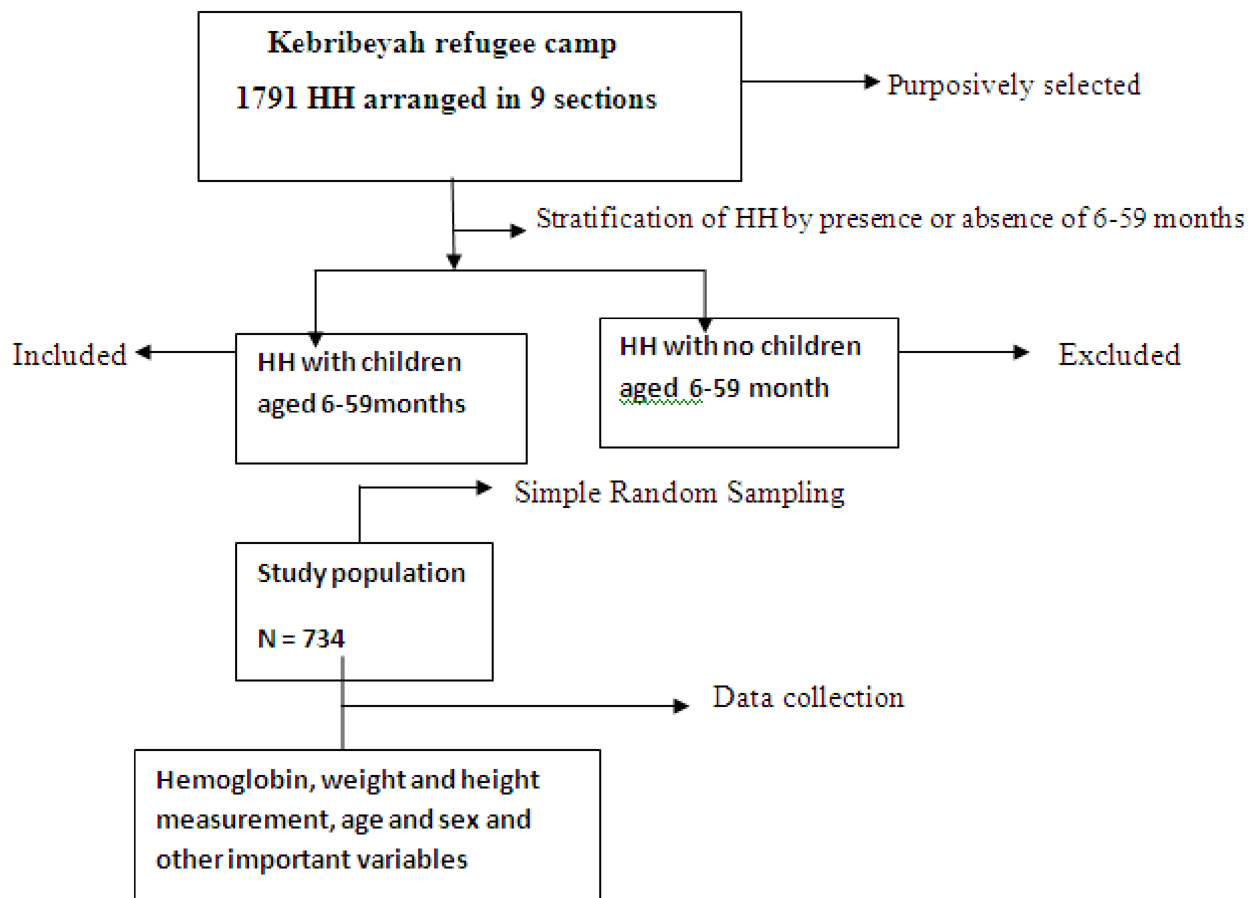
Assuming a refusal rate of 10%, the 10% of 667 households was added and the final sample size determined was: 667 + (0.1 x 667) = 734 Households were sampled using random table number.

4.6. Sampling Procedures

Kebribeyah refugee camp has 1791 households arranged in 9 sections. Households were identified by presence or absence of preschool children. Once the study population is identified then simple random sampling was employed to select the required sample size (Fig. 2.). Random table was used to drawn the study subjects. All HHs in each section have their own identification number within the section.The eligible children found in each house were chosen. When the eligibles were not at home at the first visit, the field worker a second time visit was made. If no

eligible child was found in the selected house, the next closest house was selected while maintaining the sample procedure. This was continued until the required numbers of subjects were selected

Fig.2. Schematic presentation of sampling procedure



4.7. Data Collection

Data were collected using structured questionnaire during the month of March, 2010. The questionnaire consisted of socio–demographic, anthropometric measurements, child characteristics, care practices, environmental health variables, hemoglobin estimation and pallor assessment. The questionnaire used was initially prepared in English and then translated into Somali language to make the information easily understood by the data collectors and interviewees during interview.

Fifty one data collectors including the principal investigator were engaged in the data collection. Data collectors were recruited among the health staff of the camp and community health agent (CHA) who completed secondary education and above and had relevant experience in taking finger prick blood samples, anthropometric measurements. The supervisors recruited were also

from health workers working in the refugee camp. There were six teams of eight persons composed of one supervisor, one Hemoglobin measurer including pallor assessment, one data recorder, one measurer, four helpers and locators, and two coordinators.

Both the interviewers and supervisors were trained for two days from March 02 to 03, 2010. Training was conducted in the camp and included: Objective/purpose of the study the methodology, orientation of the content of the study tools, registration and follow up procedures, data collection and interviewing approach, blood sampling and collection, anthropometric (weight and height) measurements and data recording. Practical training was also given to data collectors in taking blood samples, measuring weight and height as well as data recording and filling the questionnaire.

Ink mark was used to identify children whose weight, height, and blood samples were taken after checking all the necessary information was obtained from the HH.

Blood samples were taken from 399 study participants while anthropometric measurements and questionnaires were administered for 671 children.

Description of variables and measurements

Socio – demographic characteristics: Family size, income, families/care takers educational level, marital status, occupation, ethnicity, religion and dietary information.

Child characteristics and caring practices: Age /date of birth, birth order, sex, birth weight, current weight and height, morbidity status, food intake during uprising [tea consumption, cow's milk (powdered milk)] consumption, duration of breast feeding, access to nutritional rehabilitation program, health care seeking and immunization/vaccination, and hygiene.

Respondents/caretaker characteristics: age, height, nutrition awareness, and number of children ever born, ANC visits, pre-pregnancy weight, status during pregnancy, use of extra food during pregnancy and lactation.

Environmental health conditions: water supply/ sanitation, availability of latrine, housing condition. Other necessary information was also collected during the interview as shown under independent variables.

Age in Months: Children between 6 and 59 months were included in the survey. Dates of birth were collected from birth registration of health cards, and vaccination cards or parental recall with the help of local event recall.

Weight: Weight measurements was taken using a Salter spring type hanging scales and was measured to the nearest 0.1 kilogram (i.e., with 100g graduations).The children were weighed with minimum clothes and shoes removed. The scales were tarred using a standard 10kg weight and the pointer zeroed with the culottes before each child was weighed .The weights was read to the nearest 0.1kg. Where the child is restless and the pointer was oscillating, the midpoint of the oscillation was taken as the weight of the child.

Height/length: Measurement of length was done in a lying position with wooden board for children less than 2 years old or for those less than 85 cm in height and for children two and above years stature is measured in a standing position in centimeters to the nearest 1 cm.

Immunization/vaccinations: The family/caretakers were asked if the child had received appropriate vaccinations for the age. The response was recorded and the vaccination card was inspected as proof of vaccination and if not available families/caretakers were asked to recall it. BCG vaccination was checked by observing scar on right (also left) arm (deltoid area). In addition, families/caretakers were also asked to identify occurrence of measles in the past 6 months.

Oedema: In order to determine the presence of oedema, normal/medium thumb pressure was applied to the upper side (top) of both feet for three seconds. If a shallow print persists or depression (pitting) was found on the both feet, after the thumbs were released, then the child shows oedema. Only children with bilateral oedema were recorded as having nutritional oedema. If there is pitting on only one foot, or no pitting at all, the child was excluded from having nutritional oedema.

Blood: Blood was taken from 399 child participants from finger by a finger prick. The amount of blood taken was about 0.002ml (20µl). Hemoglobin used to determine anemia status, was measured using the HemoCue Blood Hemoglobin Photometer. The calibration of the HemoCue machine was completed daily using control cuvettes.

Morbidity: To identify retrospective morbidity of children, families/caretakers were asked about any occurrence of illness during the past two weeks. Enumerators probe to confirm nature of illness based on operational case definition.

4.8. Study variables:

4.8.1. Dependent variable: stunting, underweight, wasting and anemia

4.8.2. Independent variables: Socio – demographic factors, child characteristics, child care practices, family/ caretaker characteristics and environmental health conditions

4.9. Data quality assurance/management

The questionnaire that was prepared in English was translated equivalently to Somali language and back to English for checking language consistency and to make easily understood by the data collectors and interviewees.

Quality of data was assured by properly designed and pre – tested questionnaire.

- Proper training of data collectors and supervisors were given
- Following data collection procedures, checking for the completeness of the questionnaire by supervisors, proper categorization and coding of data were made
- Moreover, reliability of measurements was also ensured by proper scaling of data collection instruments.

4.10. Data processing and analysis

After data collection, every questionnaire was checked for the completeness and relevance. The corresponding code number was carefully written at each margin of the questionnaire. Next to this data was entered using EPI – INFO version 3.5.1 software (has Epi – Nut) to convert nutritional data into Z – scores and indices; H/A, W/A, and W/H using the NCHS/WHO reference population standard of WHO and stunting, underweight and wasting have been defined using z-score < -2 SD. Then the data were exported to SPSS version16.0 statistical software package program for data cleaning and analysis; descriptive summary using frequencies, proportions, appropriate summary tables, graphs, charts, and cross tabs, and relevant summarized information was made to present study results.

Bivariate analysis was made based on UNICEF’s analytical framework (particularly immediate/proximate and underlying causes) to identify the determinants of nutritional status i.e., independent variable that have significant role in influencing nutritional status (for acquiring malnutrition and anemia) and multivariate logistic regression was performed to control potential confounding factors.

4.11. Ethical consideration

The aim of the study was reviewed by Institutional Review Board (IRB) of College of Health Sciences, Addis Ababa University, ethical clearance committee of School of Public Health and other concerned bodies (UNHCR and ARRA). Then after obtaining ethical clearance from these bodies, an official letter was written to the study camp administrative for cooperation and to whom it may concern to permit the study which is intended on the prevalence of malnutrition and anemia and their determinants among refugee pre – school children (6-59 months) in Kebribeyah refugee camp, Ethiopia.

- Before starting data collection, the data collectors were informed to ask permission and told them the purpose of the study, its importance and benefits and, offer to answer all the questions to the study participants to confirm willingness.
- Each study participant was informed about confidentiality or privacy throughout the whole process.
- Families/caretakers consent and/or child ascent was also obtained and families/caretakers signed the consent form. In addition, affirmation was made to free withdraw the consent and stop participation at any time without any form of prejudice.
- During the data collection period, sick and severely malnourished children were referred to health facilities; nutrition rehabilitation center as well as health/nutrition advice was also given to the families/caretakers.
- Finally, upon completion of the questionnaires and taking blood samples and, anthropometric measurements the process was ended by thanking the respondents.

4.12. Operational definitions:

Acute respiratory illness: A child with cough and difficulty in breathing

Anemia: a reduction in the concentration of hemoglobin for age and sex < 11g/dl.

Complimentary food: Additional foods which are required by the child, after six months of age, in addition to sustained breastfeeding

Exclusive breastfeeding: Breast milk required by the child, upto six months without additional foods.

Diarrhea: A child with loose stools for three or more times in a day with/without a sign of dehydration

Fever: A child with high body temperature than usual

Global acute malnutrition: W/H below –2SD or less than 80% percent median with or without bilateral oedema.

Income: Monthly earning from one's business, lands, work

Internally displaced people: People leaving their homes feeling war or persecution, for reasons of race, social, political, ethnic or religion but not cross international borders.

Malnutrition: Refers to under nutrition (deficiency) that is both in protein-energy and micronutrient nutrition.

Measles: A child with fever, generalized rash and conjunctivitis (red eyes)

Ration: A fixed amount of food, fuel etc in a periodical monthly distribution from aid organization.

Refugee: A person who have been forced to leave their home country because of war, political, social, ethnic and religious reasons and crossed international borders.

Stunting: H/A that is less than the standard median NCHS/WHO reference value of below -2 SD, and below -3 SD is severe stunting

Severe wasting (severe acute malnutrition): W/H below -3SD or less than 70% of the median NCHS/WHO reference

Severe underweight: Weight-for age less than –3SD.

Underweight: W/A less than the standard median NCHS/WHO reference value of below -2 SD.

Wasting: W/H less than -2 SD of the standard median NCHS/WHO reference population.

5. RESULTS

5.1. Demographic and Socio-Economic Conditions

From the total of (734) study subjects, complete questionnaire was obtained from 671 making the response rate 91.5%. All the households assessed were Somali refugees who resided in the area for an average of 15 ±2.89 years.

As indicated in Table 2, the proportion of female headed HHs was 17.7% and 95.7% of them were married. The average family size was 9 persons per household (SD ± 3.1) while 45.3% of the HHs had more than 9 family size. Average under 5 children per HH was 1.68 (SD ± 0.70) and about 44% of the HHs had two under five year children. The majority (93.0%) of the respondents were housewives and all were Muslims.

About 80% of the households have no income while 63 (9.4 %) and 71 (10.6%) of them earn less than or equal to 250 and greater than 250 Ethiopian Birr per month respectively.

Regarding educational status, the majority of the mothers (87.6 %) and fathers (71.5%) didn't attend basic education. The proportion of mothers who attended basic education from 1-4, 5-8, and 9-12 grades were 4.9%, 5.2% and 2.2% respectively. Similarly, 6.3%, and 12.4% of the fathers attended basic education from 1-4 and 5-8 grade respectively. Secondary and above levels of education was attended by 9.7% of the fathers.

Table 2: Demographic and socio-economic characteristics of refugees in Kebribeyah refugee camp, June 2010.

Variable		Frequency (N)	Percent (%)
Head of HH	**Male**	**552**	**82.3**
	Female	**119**	**17.7**
Marital status	**Married**	**645**	**96.1**
	Divorced	**2**	**0.3**
	Widowed	**23**	**3.4**
	Separated	**1**	**0.1**
Family size	**2-5**	**97**	**14.5**
	6-9	**270**	**40.2**
	>9	**304**	**45.3**
Number of under 5 children	**1**	**300**	**44.7**
	2	**295**	**44**
	> = 3	**76**	**11.3**
Maternal formal education	**Yes**	**83**	**12.4**
	No	**584**	**87.6**
Maternal educational level	**Primary**	**64**	**77.1**
	secondary	**19**	**22.9**
Paternal formal education	**Yes**	**185**	**28.5**
	No	**464**	**71.5**
Paternal educational level	**Primary**	**79**	**42.7**
	Secondary and above	**106**	**57.3**
HH income	**>250**	**71**	**10.6**
	<=250	**63**	**9.4**
	None	**537**	**80**
Decision making on use of money	**Mainly spouse**	**69**	**51.5**
	Mainly husband	**5**	**3.7**
	Only husband	**29**	**21.6**
	Both jointly	**31**	**23.1**

5.2. Dietary Information

All HHs reported that wheat was their primary food staple diet at the time of the study. During the month of March, all HHs reported receiving some type of food aid. During the last distribution, the most common food item received by the household was wheat, blended food, vegetable oil, pulse, sugar and salt. All HH members including under five children received monthly food ration. Average ration size of 16kg wheat, 1.5 kg blended food, 1.5kg pulse, 900g vegetable oil, 450g of sugar and 150g of salt was given per person per month. The average family size was 9 persons, resulting in 144kg of wheat, 13.5kg blended food, 13.5kg pulse, 8.1kg vegetable oil, 4.0kg sugar, and 1.35 kg of salt per HH per month.

Table 3: Ration estimates for the last distribution for refugees in Kebribeyah camp, June 2010.

Ration type	**Daily ration g/person/day**	**Energy(Kcal)**	**Protein (grams)**	**Fat (grams)**
Wheat grain	**533**	**1758.9**	**65.6**	**8.0**
Blended food	**50**	**180**	**8**	**0.65**
Vegetable oil	**30**	**265.5**	**0**	**30**
Pulse	**50**	**167.5**	**11**	**0.75**
Sugar	**15**	**60**	**0**	**0**
Iodized salt	**5**	**0**	**0**	**0**
Total	**683**	**2431.9**	**84.6**	**39.4**
Minimum requirements		**2100**	**52.5**	**40**
Percentage supplied by the ration		**115.8%**	**161.1%**	**98.5%**

Three hundred ninety four (58.7%) HHs reported the ration was consumed entirely within the HH. Among those HHs not entirely consuming the ration, 137 (20.4%) reported sharing their ration with other families or neighbors, 108 (16.1%) and 32 (4.8%) also reported selling part of the ration, and both sharing with families or neighbors and selling part of the ration respectively. All families were able to cook food at home using kerosene and wood fuels.

Calculations were based on self reports of the quantity of specific commodity received during the last distribution and from the camp statistics sheet. Nutritional values were analyzed using calculating sheets developed by Medecins Sans Fronties: Nutrition guidelines, 1st edition, Paris, February1995.

Two hundred fifty four (37.9%) of the HHs reported that the general ration received will last for 15-20 days, the rest 234 (34.9%) and 183 (27.3%) of the HHs reported that the ration will stay for 21-25, and 26-30 days respectively. All HHs also reported that their main source of food was food donation given by aid organizations. Another 127 (18.9%) reported borrowed food from their neighbors and 34 (5.1%) of them bought some foods.

5.3. Child Characteristics and Caring Practices

Child characteristics

Table 4 displays, the various characteristics of the sampled children. The proportion of male (51.7%) was slightly higher than females (48.3%). Most (65.4%) of the mothers delivered their children at health institution and information on the birth weight of their respective children was obtained for 401 (59.8%). The majority (99.5%) of the children birth weight above 2.5kg.

Breast feeding: Among the 218 currently breastfeeding children, 173 (79.4 %) were exclusively breastfed. Average duration of EBF was 6.2 months (SD: ± 0.88). Similarly, 630 (93.9%) of the children were breastfed, of these 7.8%, 34.3% and 57.9% were breastfed for <12, 12-23 and ≥24 months respectively and the average duration of BF was 21.0 months (SD: ± 5.3).

Regarding immunization, 99.6% , 98.7%, 91.8% and 99.1 % of the children received BCG, DPT3, Measles and Polio vaccination respectively and 85.4% (573) received vitamin A whereas 10.4% of the respondents did not know whether their children received vitamin A or not. About 563 (83.9%) of the children visited health facility when sick. The proportion of children who took bath daily, twice, every other day and once a week was 17.1%, 23.5%, 35.9% and 23.4% respectively.

Prevalence of childhood morbidity: Diarrhea: 127 (18.9%) of the children had diarrhea in the two weeks preceding the study, of these about 83 (65.4%) were having three and above episodes of diarrhea per year.

ARI were prevalent in 66 (9.8%) of children in the last two weeks before the interview. And reported measles case was found in one child 6 months preceding the study.

Child mortality: In the last 3 months preceding the interview there were 2 deaths of under five children. The cause of the death for the one child was found to be mainly diarrheal disease while the cause for the second child was unknown.

Table 4: Child characteristics and caring practices of refugees in Kebribeyah camp, June 2010.

Child characteristics		Frequency (N)	Percent (%)
Child sex	Male	347	51.7
	Female	324	48.3
Age category	6-17	121	18
	18-29	215	32
	30-41	136	20.3
	42-53	124	18.5
	54-59	75	11.2
Diarrhea	Yes	127	18.9
	No	491	73.2
	Unknown	53	7.9
Frequency of diarrhea per year	1 episode	27	21.3
	2 episodes	17	13.4
	>= 3episodes	83	65.4
Bloody diarrhea	Yes	22	17.3
	No	93	73.2
	Unknown	12	9.4
ARI	Yes	66	9.8
	No	569	84.8
	Unknown	36	5.4
EBF	4-5.9 months	199	91.3
	Don't know	19	8.7
Duration of BF	<11 months	49	7.3
	12-23 months	216	32.2
	>=24 months	365	54.4
	Don't know	41	6.1
Children immunized			
	BCG	668	99.6
	DPT	662	98.7
	Measles	616	91.8
	Polio	665	99.1
Vit. A supplementation			
	Yes	573	85.4
	No	28	4.2
	Don't know	70	10.4
Child took bath per week	Once	115	17.1
	Twice	158	23.5
	Every other day	241	35.9
	Daily	157	23.4
Ever taking to health center	Yes	563	83.9
	No	108	16.1

5. 4. Maternal/care takers characteristics

As indicated in Table 5, the mean age of mothers was 31.6 (SD: ± 8.05) years and the average age at first birth was 18.4 (SD: ±2.60) years. Mothers who gave first birth at age less than 15, 15-17 and ≥ 18 years were 8 (1.2%), 240 (36%) and 419 (62.8%) respectively.

Average total children born to a mother was 4.87 (SD: ± 2.67) and 260 (39%) of the mothers gave birth of 5 and above children. And the average number of ANC attendance among the mothers was 6.25 (SD: ± 2.57) times. Mothers who had ANC starting at the 4th months were 328 (49.8%). But in general, 658 (98.7%) of the mothers attended ANC services during pregnancy (Table 5).

Concerning family planning, 659 (98.8%) of mothers knew about family planning. The percentage of mothers who did not use FP was 453 (67.9%).

5. 5. Environmental Health conditions

All households used pipe water and HHs that used more than 40 Lt per day were 444 (66.2%) while 152 (22.7%) of the HHs used 20 -40 Lt per day and the rest 12 (1.8%) responded to use less than 20 Lt. The average HHs water consumption was 23.3 Lt per day. All HHs have water collection material (receptacle) like Plastic jars and Jerri-cans. None of HHs used water treatment to make safe the water for drinking purpose. The majority (87.8%) had latrine and the type of the latrine was traditional pit latrine. The housing type of the respondents was 100% plastic sheeting/other covering and all the houses lack windows for proper ventilation. Regarding solid waste disposal the majority (64.1%) of them used communal pit for solid waste disposal (Table 5).

Table 5: Maternal/care takers characteristics and Environmental health conditions of refugees in Kebribeyah camp, June 2010.

Maternal/care takers characteristics		Frequency (N)	Percent (%)
Maternal age at first birth	<15 years 15-17years >= 18 years	8 240 419	1.2 36 62.8
Total children born to a mother	<= 4 > 4	341 326	51.1 48.9
ANC visit	Yes No	658 9	98.7 1.3
Do you know FP	Yes No	659 8	98.8 1.2
Ever use of FP methods	Yes No	206 453	30.1 67.9
Health status during pregnancy	Good Not good/sick	605 62	90.7 9.3
Environmental health conditions			
Water source	Pipe water	671	100
HH water use	< 20 Lt 20-40 Lt >40 Lt	75 152 444	11.2 22.7 66.2
Time taken to fetch water	< 15 minutes 15-30 minutes 30 minute -1hr 1 hour	168 164 261 78	25 24.4 38.9 11.6
Availability of latrine	Yes No	589 82	87.8 12.2
Type of shelter	Plastic sheeting or other covering	671	100
Solid waste disposal	Communal pit Burning Open dump Both communal pit and burning	430 147 39 55	64.1 21.9 5.8 8.2

5. 6. Nutritional Status of Children

The prevalence of stunting, underweight and wasting was 27.6%, 26.1% and 8.9% respectively. Similarly, severe stunting, underweight and wasting (SAM) were 9.5%, 4.8% and 2.5% respectively.There were no cases of edema identified among the children living in the camp. There were some variations of occurrence of malnutrition by sex and age category. Male children were 3.5 times more severely underweight than females (OR= 3.5, 95% CI: 1.5- 8.2) (Table 6).

Table 6: Prevalence of malnutrition among refugee children in Kebribeyah camp, June 2010.

	Sex			
	Male	Female		
Variables	**No (%)**	**No (%)**	**Total (%)**	**OR (95% CI)**
Stunting	**101 (15.1)**	**84 (12.5)**	**185 (27.6)**	**0.9 (0.6, 1.2)**
Severe stunting	**41 (6.1)**	**23 (3.4)**	**64 (9.5)**	**1.8 (1.0, 3.0)***
Underweight	**104 (15.5)**	**71 (10.6)**	**175 (26.1)**	**1.5 (1.1, 2.2)***
Severe underweight	**25 (3.7)**	**7 (1)**	**32 (4.8)**	**3.5 (1.5, 8.2)***
Wasting	**34 (5)**	**26 (3.9)**	**60 (8.9)**	**1.2 (0.7, 2.1)**
Severe wasting	**9 (1.3)**	**8 (1.2)**	**17 (2.5)**	**1.1 (0.4, 2.8)**
***Significant at p < 0.05**				

Prevalence of severe stunting significantly increased in children aged 18- 41 and 54 -59 months. Children aged 6-17 and 42-53 months were relatively protected from stunting (Table 7). Being severely underweight has a significant association with being severely stunted and wasted; severely underweight children were 22.5 times more likely to be stunted (OR= 22.5, 95% CI: 10.3-49.1) and 7 time more likely wasted (OR= 6.9, 95% CI: 2.1- 22.5). There was also a significant difference of underweight by sex and age group. Male children were 1.5 times underweight than females (OR= 1.5, 95% CI: 1.1-2.2) (Table 8).

Table 7: Prevalence of severe malnutrition by age category and sex among refugee children, in Kebribeyah camp, June 2010.

Age category (Months)	Total No (%)	Severe stunting No (%)	OR (95% CI)	Severe underweight No (%)	OR (95 CI)	Severe wasting No (%)	OR (95% CI)
6-17	121 (18)	4 (3.3)	1.0	6 (5)	1.0	7 (5.8)	1.0
18-29	215 (32)	25 (11.6)	3.8 (1.3, 11.3)*	15 (7)	1.4 (0.5, 3.8)	7 (3.3)	0.5 (0.2, 1.6)
30 -41	136 (20.3)	22 (16.2)	5.6 (1.9, 16.9)*	9 (6.6)	1.4 (0.5, 3.9)	2 (1.5)	0.2 (0.1, 1.2)
42-53	124 (18.5)	5 (4)	1.2 (0.3, 4.7)	1 (0.1)	0.2 (0.0, 1.3)		
54-59	75 (11.2)	8 (10.5)	3.5 (1.0, 12.0)	1 (1.3)	0.3 (0.0, 2.2)	1 (1.3)	0.2 (0.0, 1.8)
Total	671 (100)	64 (9.5)		32 (4.8)		17 (2.5)	
Child sex							
Male	347 (51.7)	41 (11..8)	1.8 (1.0, 3.0)*	25 (7.2)	3.5 (1.5, 8.2)*	9 (2.6)	1.1 (0.4, 2.8)
Female	324 (48.3)	23 (7.1)	1.0	7 (2.2)	1.0	8 (2.5)	1.0
Total	671 (100)	64 (9.5)		32 (4.8)		17 (2.5)	

*Significant at $p < 0.05$

The distribution of severe malnutrion by age category among the study participants is demoneatratd in Figure 2 below.

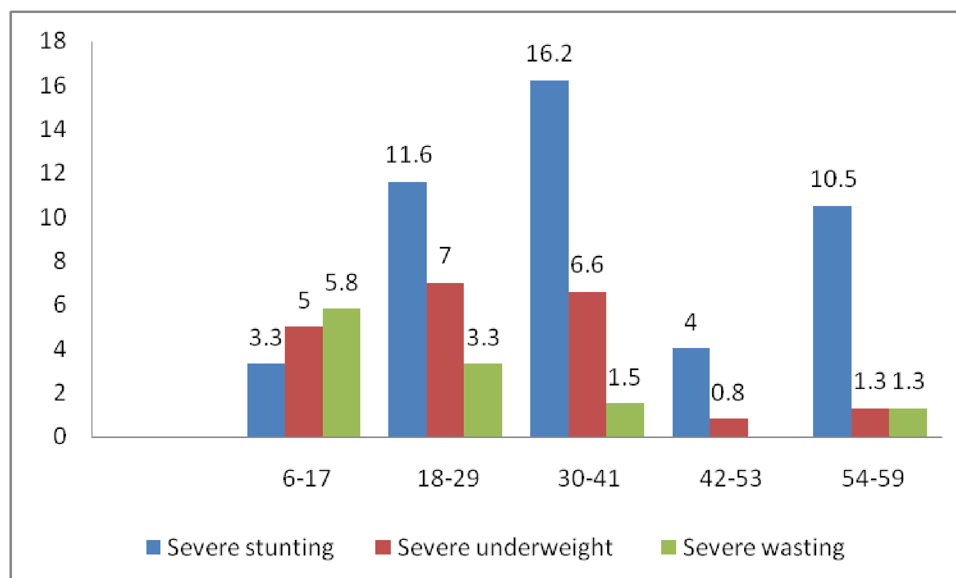


Fig 2. Distribution of severe malnutrition by age category in refugee children, in Kebribeyah camp, June 2010.

The prevalence of stunting also significantly increased as severe stunting in children aged 18-41 months while children aged from 42-59 were relatively protected from stunting. Underweight was high in children aged 6-29 months. Being underweight has a significant association with

being stunted and wasted; underweight children were 9 times more likely stunted (OR= 8.8, 95% CI: 5.9-13.0) and 12 times more likely wasted (OR= 12.3, 95% CI: 6.5-23) (Table 8)

Table 8: Prevalence of malnutrition by age category and sex among refugee children, in Kebribeyah camp, June 2010.

Age category (Months)	Total No (%)	Stunting No (%)	Stunting OR (95% CI)	Underweight No (%)	Underweight OR (95% CI)	Wasting No (%)	Wasting OR (95% CI)
6-17	121 (18)	23 (19)	1.0	34 (28.1)	2.3 (1.1, 4.8)*	22 (18.2)	8.1 (1.8, 35.6)*
18-29	215 (32)	65 (30)	1.9 (1.1, 3.2)*	73 (34)	3.0 (1.5, 6.0)*	19 (8.8)	3.5 (0.8, 15.6)
30 -41	136 (20.3)	45 (33.1)	2.1 (1.2, 3.8)*	33 (24.3)	1.9 (0.9, 3.9)	7 (5.1)	2.0 (0.4, 9.8)
42-53	124 (18.5)	31 (25)	1.4 (0.8, 2.6)	24 (19.4)	1.4 (0.6, 3.0)	10 (8.1)	3.2 (0.7, 15)
54-59	75 (11.2)	21 (28)	1.7 (0.8, 3.3)	11 (14.7)	1.0	2 (2.7)	1.0
Total	671 (100)	185 (27.6)		175 (26.1)		60 (8.9)	
Child sex							
Male	347 (51.7)	101 (29.1)	1.0	104 (30)	1.5 (1.1, 2.2)*	34 (9.8)	1.2 (0.7, 2.1)
Female	324 (48.3)	84 (25.9)	0.9 (0.6, 1.2)	71 (21.9)	1.0	26 (8)	1.0
Total	671 (100)	185 (27.6)		175 (26.1)		60 (8.9)	

*Significant at $p < 0.05$

The distribution of the calculated prevalence of stunting, underweight and wasting by age category is shown in Figure 3.

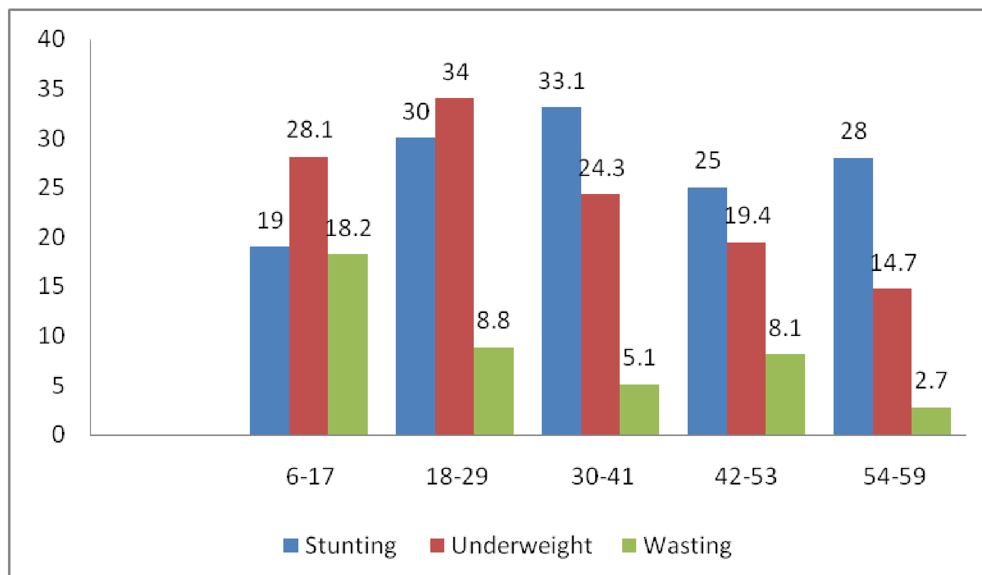


Fig 3. Distribution of stunting, underweight and wasting by age category in refugee children, Kebribeyah camp, June 2010.

5. 7. Determinants of Child Malnutrition

Differentials and determinants of malnutrition were identified by some selected variables related to demographic, socio-economic, child, maternal and environmental health aspects.

Chronic malnutrition (Stunting)

The causes of chronic malnutrition (stunting) from Bivariate and Multiple logistic regression analysis are given in table 9 below. Prevalence of stunting among children of illiterate mothers was 2.2 times higher than those children of mothers attended basic education (OR=2.2, 95% CI: 1.2- 4.1). Similarly, stunting was 2 times higher among children of illiterate fathers than those children of fathers attended formal education (OR= 2, 95% CI: 1.3-3.0).

Stunting was also 1.5 times higher in children living with family size 6-9 persons than those households having family size below 6 persons. However, in HHs 9 persons and above it was relatively protective. No difference in stunting by sex was found (29.1% for male Vs 25.9 % for females) (Table 9).

In multiple logistic regressions analysis, paternal formal education influenced the prevalence of stunting by 1.7 times higher among children of fathers lacking basic education than those children of fathers who attended formal education (Adjusted OR= 1.7, 95% CI: 1.1-2.7).

Table 9: Results of the factors associated with stunting in Bivariate and Multivariate Logistic Regression analysis in Kebribeyah refugee camp, June 2010.

Variables		Stunting No (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Child sex	**Male**	**101 (29.1)**	**1.0**	**1.0**
	Female	**84 (25.9)**	**0.9 (0.6, 1.2)**	**0.9 (0.6, 1.2)**
Age category	**6-17**	**23 (19)**	**1.0**	**1.0**
	18-29	**65 (30)**	**1.9 (1.1, 3.2)***	**1.7 (1.0, 3.1)**
	30 -41	**45 (33.1)**	**2.1 (1.2, 3.8)***	**1.9 (1.0, 3.6)**
	42-53	**31 (25)**	**1.4 (0.8, 2.6)**	**1.2 (0.6, 2.4)**
	54-59	**21 (28)**	**1.7 (0.8, 3.3)**	**1.5 (0.7, 3.2)**
Marital status	**Married**	**180 (27.9)**	**1.0**	**1.0**
	Widowed	**5 (21.7)**	**0.7 (0.3, 2.0)**	**1.1 (0.3, 3.5)**
Maternal formal education	**Yes**	**13 (15.7)**	**1.0**	**1.0**
	No	**171 (29.3)**	**2.2 (1.2, 4.1)***	**1.7 (0.9, 3.3)**
Paternal formal education	**Yes**	**35 (18.9)**	**1.0**	**1.0**
	No	**146 (31.5)**	**2.0 (1.3, 3.0)***	**1.7 (1.1, 2.7)***
Family size	**2-5**	**23 (23.7)**	**1.0**	**1.0**
	6-9	**87 (32.2)**	**1.5 (1.1, 2.6)***	**1.4 (0.8, 2.4)**
	>9	**75 (24.7)**	**1.1 (0.6, 1.8)**	**0.9 (0.5, 1.6)**
Number of under 5 children	**1**	**79 (26.3)**	**1.0**	**1.0**
	2	**86 (29.2)**	**1.2 (0.8, 1.6)**	**1.3 (0.9, 1.8)**
	>= 3	**20 (26.3)**	**1.0 (0.6, 1.8)**	**1.1 (0.6, 2.1)**
ANC visit	**Yes**	**182 (27.7)**	**1.0**	**1.0**
	No	**2 (22.2)**	**0.7 (0.2, 3.6)**	**0.8 (0.2, 3.9)**
Ever use of FP	**Yes**	**65 (31.6)**	**1.0**	**1.0**
	No	**119 (25.8)**	**0.8 (0.5, 1.1)**	**0.8 (0.5, 1.1)**
Entire ration consumption by HH	**Yes**	**114 (28.9)**	**1.0**	**1.0**
	No	**71 (25.6)**	**0.8 (0.6, 1.2)**	**1.0 (0.7, 1.4)**
Duration of ration stay (Inadequate of food)	**15-20 days**	**59 (23.3)**	**0.6 (0.4, 1.0)**	**0.6 (0.4, 1.0)**
	21-25 days	**67 (28.7)**	**0.8 (0.6, 1.3)**	**0.9 (0.6, 1.3)**
	26-30 days	**59 (32.2)**	**1.0**	**1.0**
Presence of diarrhea	**Yes**	**41 (32.3)**	**1.4 (0.9, 2.1)**	**1.6 (1.0, 2.4)**
	No	**125 (25.5)**	**1.0**	**1.0**
Presence of ARI	**Yes**	**15 (22.7)**	**0.8 (0.4, 1.4)**	**0.7 (0.4, 1.3)**
	No	**159 (27.9)**	**1.0**	**1.0**
Availability of toilet facility	**Yes**	**159 (27)**	**1.0**	**1.0**
	No	**26 (31.7)**	**1.3 (0.8, 2.1)**	**1.3 (0.8, 2.1)**
HH water use	**< 20 Lt**	**5 (41.2)**	**1.9 (0.6, 6.2)**	**1.9 (0.6, 6.2)**
	20 -40 Lt	**44 (28.9)**	**1.1(0.7, 1.7)**	**1.1 (0.8, 1.8)**
	>40 Lt	**136 (26.8)**	**1.0**	**1.0**
***Significant at $p < 0.05$**				

Underweight (Weight - for - age)

Results from Bivariate and Multiple regression analysis for the causes of underweight were shown in table 10. Underweight showed high association with children of mothers who didn't attend basic education, in children who had diarrhea and ARI, and in HHs lack toilet facility. Child sex and age were also associated with underweight. Underweight among children of mothers who lack basic education was 1.7 times higher than those children of mothers attended formal education (OR= 1.7, 95% CI: 1.1-3.1).

Children having diarrhea and ARI were 1.6 and 2 times underweight than those children who hadn't had diarrhea (OR= 1.6, 95% CI: 1.1-2.4) and ARI (OR= 2, 95% CI: 1.2-3.4) respectively, and children from those HHs lack toilet facility were 1.9 times underweight than those children from HHs that had toilet (OR= 1.9, 95% CI: 1.2-3.0) (Table 10).

In multiple logistic regression analysis, presence of ARI in children (AOR= 1.9, 95% CI: 1.1-3.4), lack of toilet facility (AOR= 1.9, 95% CI: 1.2-3.1), child sex and age were retained their association with underweight. Child sex also associated with underweight (Table 10).

Table 10: Results of the factors associated with underweight in Bivariate and Multivariate Logistic Regression analysis, in Kebribeyah refugee camp, June 2010.

Variables		Underweight No (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Child sex	Male	104 (30)	1.5 (1.1, 2.2)*	1.5 (1.1, 2.2)*
	Female	71 (21.9)	1.0	1.0
Age category	6-17	34 (28.1)	2.3 (1.1, 4.8)*	2.8 (1.2, 6.4)*
	18-29	73 (34)	3.0 (1.5, 6.0)*	3.4 (1.6, 6.9)*
	30 -41	33 (24.3)	1.9 (0.9, 3.9)	2.1 (1.0, 4.6)
	42-53	24 (19.4)	1.4 (0.6, 3.0)	1.5 (0.7, 3.2)
	54-59	11 (14.7)	1.0	1.0
Marital status	Married	169 (26.2)	1.0	1.0
	Widowed	6 (26.1)	1.0 (0.4, 2.6)	1.3 (0.5, 3.7)
Maternal formal education	Yes	15 (18.1)	1.0	1.0
	No	160 (27.4)	1.7 (1.1, 3.1)*	1.7 (0.9, 3.3)
Paternal formal education	Yes	43 (23.2)	1.0	1.0
	No	126 (27.2)	1.2 (0.8, 1.8)	1.1 (0.7, 1.7)
Family size	2-5	31 (32)	1.0	1.0
	6-9	70 (25.9)	0.7 (0.4, 1.2)	0.7 (0.4, 1.2)
	>9	74 (24.3)	0.7 (0.4, 1.1)	0.6 (0.4, 1.1)
Number of under 5 children	1	76 (25.3)	1.0	1.0
	2	82 (27.8)	1.4 (0.8, 1.6)	1.2 (0.8, 1.8)
	>= 3	17 (22.4)	0.8 (0.5, 1.5)	0.9 (0.5, 1.8)
ANC visit	Yes	174 (26.4)	1.0	1.0
	No	1 (11.1)	0.3 (0.0, 2.8)	0.4 (0.0, 3.1)
Ever use of FP	Yes	56 (27.2)	1.0	1.0
	No	119 (25.8)	0.9 (0.6, 1.4)	0.9 (0.6, 1.4)
Entire ration consumption by HH	Yes	100 (25.4)	1.0	1.0
	No	75 (27.1)	1.1 (0.8, 1.5)	1.2 (0.8, 1.7)
Duration of ration stay (Inadequate food)	15-20 days	60 (23.6)	0.8 (0.5, 1.3)	0.8 (0.5, 1.2)
	21-25 days	65 (27.8)	1.0 (0.7, 1.6)	1.0 (0.7, 1.5)
	26-30 days	59 (27.3)	1.0	1.0
Presence of diarrhea	Yes	43 (33.9)	1.6 (1.1, 2.4)*	1.3 (0.8, 2.0)
	No	120 (24.4)	1.0	1.0
Presence of ARI	Yes	26 (39.4)	2.0 (1.2, 3.4)*	1.9 (1.1, 3.4)*
	No	138 (24.3)	1.0	1.0
Availability of toilet facility	Yes	144 (24.4)	1.0	1.0
	No	31 (37.8)	1.9 (1.2, 3.0)*	1.9 (1.2, 3.1)*
HH water use	< 20 Lt	4 (33.3)	1.4 (0.4, 4.8)	1.4 (0.4, 4.8)
	20 -40 Lt	40 (26.3)	1.0 (0.7, 1.5)	1.1 (0.7, 1.7)
	>40 Lt	131 (25.8)	1.0	1.0
*Significant at $p < 0.05$				

Acute malnutrition (Wasting)

Table 11 shows some of the determinant of wasting. Wasting was prevalent in HHs that shared their ration with other families/neighbors and sold part of it, the duration of the ration stayed (inadequate food), with the presence of ARI and number of baths took per week by children. The prevalence of acute malnutrition was 2 times higher in HHs that shared their ration with families/neighbors and/or sold part of it than those HHs that consumed the entire ration within the HHs (OR=2.0, 95% CI: 1.2-3.4).

The prevalence of wasting was 2.9 times higher in HHs that the duration of ration last for 15-20 days than those HHs that the duration of ration stayed for 26-30 days (OR= 2.9, 95% CI: 1.4 - 5.9) and10 times higher among children who had ARI than those children without ARI (OR=10.2, 95% CI: 5.5- 18.9). Wasting was also 2.7 times higher among children who took baths once a week than those children who took baths daily (OR= 2.7, 95% CI: 1.1-6.3).

However, in multiple logistic analyses, the duration of ration lasting which indicates either inadequacy of food in the HH or due to sharing/selling part of the ration, and presence of ARI were remained significantly associated with wasting. In HHs that the duration of ration lasted for 15-20 days wasting was 3.7 times higher than those HHs that the duration of ration stayed for 26 -30 days. Children with ARI two weeks preceding the study were 12 times more wasted (AOR= 12.1, 95% CI: 5.9-24.8) than those who hadn't had it.

Some variables including length of exclusive breastfeeding, duration of breastfeeding, marital status, ANC visit, ever use of family planning, number of under 5 children, HH water use and maternal age at first birth were not found significantly associated with any of nutritional outcomes/indices.

Table 11: Results of factors associated with wasting in Bivariate and Multivariate Logistic Regression analysis, in Kebribeyah refugee camp, June 2010.

Variables		Wasting No (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Child sex	Male	34 (9.8)	1.2 (0.7, 2.1)	1.3 (0.7, 2.4)
	Female	26 (8)	1.0	1.0
Age category	6-17	22 (18.2)	8.1 (1.8, 35.6)*	6.0 (1.2, 29.6)*
	18-29	19 (8.8)	3.5 (0.8, 15.6)	3.5 (0.7, 16.5)
	30 -41	7 (5.1)	2.0 (0.4, 9.8)	2.0 (0.4, 10.7)
	42-53	10 (8.1)	3.2 (0.7, 15.0)	3.7 (0.7, 18.3)
	54-59	2 (2.7)	1.0	1.0
Marital status	Married	59 (9.1)	1.0	1.0
	Widowed	1 (4.3)	0.5 (0.1, 3.4)	0.5 (0.1, 4.3)
Maternal formal education	Yes	5 (6)	1.0	1.0
	No	55 (26.1)	1.6 (0.6, 4.2)	1.7 (0.6, 4.7)
Paternal formal education	Yes	16 (8.6)	1.0	1.0
	No	43 (9.3)	1.1 (0.6, 2.0)	1.0 (0.5, 1.8)
Family size	2-5	9 (9.3)	1.0	1.0
	6-9	21 (7.8)	0.8 (0.4, 1.9)	0.8 (0.3, 1.8)
	>9	30 (9.9)	1.1 (0.5, 2.3)	1.0 (0.5, 2.3)
Number of under 5 children	1	25 (8.3)	1.0	1.0
	2	29 (9.8)	1.2 (0.7, 2.1)	1.2 (0.7, 2.1)
	>= 3	6 (7.9)	0.9 (0.4, 2.4)	0.8 (0.3, 2.2)
Ever use of FP	Yes	22 (10.7)	1.0	1.0
	No	38 (8.2)	0.8 (0.4, 1.3)	0.8 (0.4, 1.3)
Entire ration consumption by HH	Yes	39 (9.9)	1.0	1.0
	No	21 (7.6)	2.0 (1.2, 3.4)*	1.6 (0.9, 2.9)
Duration of ration stay (Inadequacy of food)	15-20 days	36 (14.2)	2.9 (1.4, 5.9)*	2.3 (1.1, 5.0)*
	21-25 days	14 (6)	1.1 (0.5, 2.5)	0.9 (0.4, 2.2)
	26-30 days	10 (5.5	1.0	1.0
Presence of diarrhea	Yes	14 (11)	1.4 (0.7, 2.6)	0.5 (0.2, 1.2)
	No	41 (8.4)	1.0	1.0
Presence of ARI	Yes	25 (37.9)	10.2 (5.5, 18.9)*	12.1 (5.9, 24.8)*
	No	32 (5.6)	1.0	1.0
Availability of toilet facility	Yes	53 (9)	1.0	1.0
	No	7 (8.5)	0.9 (0.4, 2.2)	1.0 (0.4, 2.3)
HH water use	< 20 Lt	1 (8.3)	1.0 (0.1, 8.0)	1.0 (0.1, 8.0)
	20 -40 Lt	17 (11.2)	1.4 (0.8, 2.5)	1.4 (0.8, 2.5)
	>40 Lt	42 (8.3)	1.0	1.0
Number of Baths child took per week	Once	16 (13.9)	2.7 (1.1, 6.3)*	1.9 (0.7, 5.6)
	Twice	9 (5.7)	1.0 (0.4, 2.6)	1.0 (0.3, 2.8)
	Every other day	26 (10.8)	2.0 (0.9, 4.4)	1.4 (0.6, 3.3)
	Daily	9 (5.7)	1.0	1.0
*Significant at p < 0.05				

5.8. ANAEMIA

Of 671 HHs involved in assessment of malnutrition, 399 (60%) of them were assessed for anemia as measured by hemoglobin measurement.

5.8.1. Prevalence of Anemia

Of 399 children tested for anemia, 209 (52.4%) were anemic (<11g/dl). The prevalence of moderate and severe anemia was 41.9 % and 10.5% respectively. The mean hemoglobin level in children was 10.7g/dl (SD: ± 1.9) with a range of 5.3-14.6 g/dl. The distribution of moderate, severe and total anaemia is displayed in Figure 4.

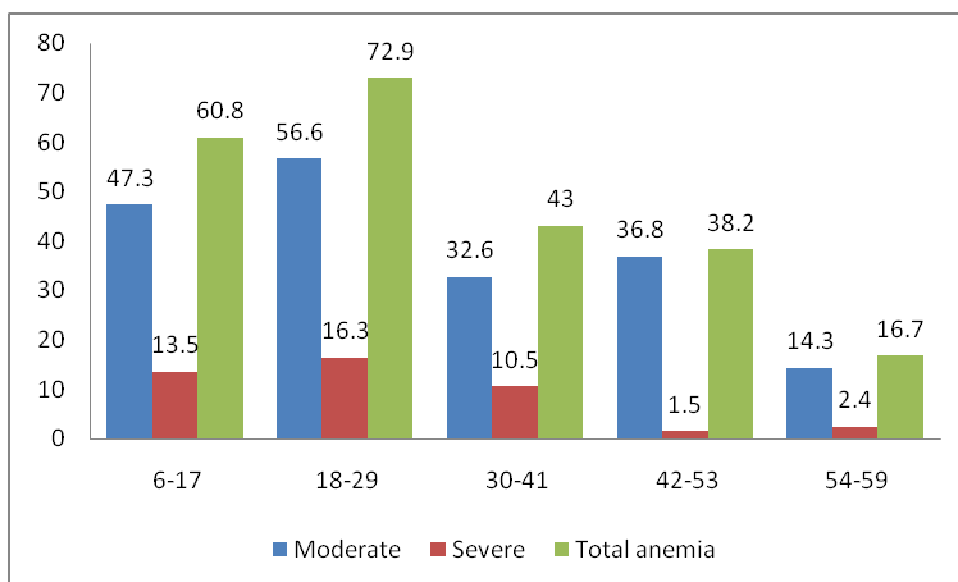


Fig 1. Distribution of moderate, severe and total anemia by age category among refugee children, in Kebribeyah camp, June 2010.

The presence or absence of pallor was checked on conjunctivae, palm, nail beds, face and skin of children. Of 399 children, 120 (30.1%) children had pallor in one or more of the examination sites.There was no significant difference of prevalence of anemia by sex. However, there were some variations of occurrence of anemia by age group.

Moderate anemia was prevalent among children aged 30 -41 and 45-59 months and also among children two years and above but children less than two years were relatively protected. On the other hand, the prevalence of severe anaemia was high among children aged 18-29 months (Table 12).

Table12: Prevalence and severity of Anemia by sex and age category of refugee children, in Kebribeyah camp, June 2010.

Variables		Degree of anaemia (Hb level)				
		Moderate (8-11g/dl)		Severe (<8g/dl)		Total
		No (%)	OR (95% CI)	No (%)	OR (95% CI)	No (%)
Child sex	**Male**	**96 (44.4)**	**1.0**	**24 (11.1)**	**1.0**	**120 (55.6)**
	Female	**71 (38.8)**	**1.3 (0.8, 1.9)**	**18 (9.8)**	**0.9 (0.5, 1.7)**	**89 (48.6)**
	Total	**167 (41.9)**		**42 (10.5)**		**209 (52.4)**
Age category	**6-17**	**35 (47.3)**	**1.0**	**10 (13.5)**	**6.4 (0.8, 52.0)**	**45 (60.8)**
	18-29	**73 (56.6)**	**0.7 (0.4, 1.2)**	**21 (16.3)**	**8.0 (1.1, 61.2)***	**94 (72.9)**
	30-41	**28 (32.6)**	**1.9 (1.0, 3.5)**	**9 (10.5)**	**4.8 (0.6, 39.2)**	**37 (43.0)**
	42-53	**25 (36.8)**	**1.5 (0.8, 3.0)**	**1 (1.5)**	**0.6 (0.0, 10.1)**	**26 (38.2)**
	54-59	**6 (14.3)**	**5.4 (2.0, 14.3)***	**1 (2.4)**	**1.0**	**7 (16.7)**
	Total	**167 (41.9)**		**42 (10.5)**		**209 (52.4)**
***Significant at p < 0.05**						

5.8.2. Determinants of Anemia.

Age of child, paternal educational level, number of under five children in HH, duration of ration lasted (either due to sharing/selling part of ration or inadequacy of ration), presence of diarrhea, personal hygiene of child (number of baths child took), stunting and underweight were significantly associated with anaemia at 95% confidence level (Table13).

Anaemia was associated with age and was high in each age category (Table 13). Prevalence of anemia among children of illiterate fathers was 2 times higher than those children of fathers attended basic education (OR= 1.8, 95% CI: 1.1- 2.8).

Two times higher among children who had diarrhea than those children who hadn't had diarrhea (OR= 2, 95% CI: 1.2-3.3) and 3 times higher among those children who took baths once per week than those children took baths daily (OR=3, 95% CI: 1.6-5.8). 1.5 times higher in HHs having number of under five children 2 (OR= 1.5, 95% CI: 1.1- 2.3), and 2 times higher in those HHs having number of under five children three and above (OR= 2, 95% CI: 1.1-3.8).

In HHs that shared their ration with neighbors/other families and sold part of it, the prevalence of anemia was 1.6 times higher than those HHs that consumed the entire ration within their HH (OR=1.6, 95% CI: 1.1-2.5). And it was 1.9 times higher in HHs that the duration of ration stayed for 15-20 days than HHs that the ration stayed for 26-30 days (OR= 1.9, 95% CI: 1.2-3.1). Stunted and underweight children were also 2.2 times (OR= 2.2, 95% CI: 1.4 – 3.4) and 2.5

times (OR=2.5, 95% CI: 1.5-3.9) higher to be anemic than those well nourished children respectively.

However, in the adjusted analysis, childe age, number of under five children in HH and underweight (Weight-for-age) retained their association with anaemia. Regression analysis upon the subject characteristics demonstrates that the risk of anaemia is higher in children who are underweight and in HHs that have 2 and above under five children. Underweight children were 2.2 times higher to be anemic than those children > = -2 z-score (AOR= 2.2, 95% CI: 1.2-4.1). Factors that were not found to be associated with anemia were child sex, family size, EBF, duration of BF, tea consumption, use of cow's milk, Weight-for-height, ANC, ever use of family planning, ARI, toilet facility and HH water use.

Table 13: Results of the factors associated with anaemia in Bivariate and Multivariate Logistic Regression analysis, in Kebribeyah refugee camp, June 2010.

Variables		Anaemia No (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Child sex	Male	120 (55.6)	1.3 (0.9, 2.0)	1.3 (0.9, 2.0)
	Female	89 (48.6)	1.0	1.0
Age category	6-17	45 (60.8)	7.8 (3.0, 19.8)*	6.4 (2.3, 17.4)*
	18-29	94 (72.9)	13.4 (5.5, 33.0)*	13.5 (5.3, 34.1)*
	30 -41	37 (43)	3.8 (1.5, 9.4)*	3.9 (1.5, 9.9)*
	42-53	26 (38.2)	3.1 (1.2, 8.0)*	3.4 (1.3, 8.9)*
	54-59	7 (16.7)	1.0	1.0
Maternal formal education	Yes	19 (39.6)	1.0	1.0
	No	188 (55.6)	1.8 (1.0, 3.3)	0.2 (0.0, 3.0)
Paternal formal education	Yes	42 (42)	1.0	1.0
	No	161 (56.5)	1.8 (1.1, 2.8)*	0.6 (0.4, 1.0)
Number of under 5 children	1	79 (45.7)	1.0	1.0
	2	102 (56.4)	1.5 (1.1, 2.3)*	1.7 (1.1, 2.6)*
	>= 3	28 (62.2)	2.0 (1.1, 3.8)*	2.3 (1.1, 4.7)*
ANC visit	Yes	204 (52.3)	1.0	1.0
	No	3 (50)	0.9 (0.2, 4.6)	1.0 (0.2, 5.1)
Entire ration consumption by HH	Yes	108 (47.2)	1.0	1.0
	No	101 (59.4)	1.6 (1.1, 2.5)*	1.4 (0.9, 2.2)
Duration of ration stay (Inadequacy of food)	15-20 days	93 (57.8)	1.9 (1.2, 3.1)*	1.6 (1.0, 2.8)
	21-25 days	72 (54.1)	1.6 (1.0, 2.7)	1.4 (0.8, 2.5)
	26-30 days	44 (44.1)	1.0	1.0
Vit. A supplementation	Yes	180 (53.6)	1.0	1.0
	No	8 (50)	0.9 (0.3, 2.3)	0.9 (0.3, 2.8)
Tea consumption	Yes	115 (53.5%)	0.9 (0.6, 1.3)	1.0 (0.6, 1.4)
	No	94 (51.1%)	1.0	1.0
Presence of diarrhea	Yes	55 (65.5)	2.0 (1.2, 3.3)*	1.0 (0.6, 1.7)
	No	142 (50.5)	1.0	1.0
Presence of ARI	Yes	24 (63.2)	1.7 (0.8, 3.3)	1.5 (0.7, 3.3)
	No	165 (49.4)	1.0	1.0
HH water use	< 20 Lt	6 (50)	1.0 (0.2, 5.2)	1.0 (0.2, 5.3)
	20 -40 Lt	62 (61.4)	1.6 (1.0, 2.6)	1.6 (1.0, 2.5)
	>40 Lt	144 (49.3)	1.0	1.0
Number of Baths child took per week	Once	54 (70.1)	0.3(1.6, 5.8)*	1.7 (0.8, 3.6)
	Twice	44 (47.8)	1.2 (0.7, 2.1)	0.7 (0.4, 1.4)
	Every other day	73 (51.0)	1.3 (0.8,2.3)	0.9 (0.5, 1.7)
	Daily	38 (43.7)	1.0	1.0
HFA	>= -2 Z- score	132 (48.8)	1.0	1.0
	< - 2 Z-score	77 (65.8)	2.2 (1.4, 3.4)*	1.5 (0.9, 2.6)
WFA	>= -2 Z-score	136 (46.6)	1.0	1.0
	< -2 Z-score	73 (68.2)	2.5 (1.5, 3.9)*	2.2 (1.2, 4.1)*
WFH	>= -2 Z- score	186 (52)	1.0	1.0
	< -2 Z- score	23 (56.1)	1.2 (0.6, 2.3)	0.8 (0.3, 1.7)
*Significant at p < 0.05				

6. DISCUSSION

6.1. MALNUTRITION

In the present study, the oversall global acute malnutrition (GAM) rate is 8.9%, while the severe acute malnutrition (SAM) rate is 2.5%. According to the WHO standard classification the state of malnutrition can therefore be classified as poor (45). The prevalence of stunting and underweight in the area were also 27.6% and 26.1% respectively.

Generally the nutritional status of the participants in this study is much better than those similar studies conducted in other refugee camps. When compared with studies conducted in Southern Sudan refugee camps stunting of 45%, underweight of 48% and wasting of 22%, the present finding's are lower (33). It is also lower when compared with the prevalence of stunting and underweight reported for Osire refugee camp in Namibia which is as high as 41% and 45% respectively (39).

However, wasting (8.9%) of the children in the study area was a bit higher than that of studies done in Burmese and Osire refugee camps (17, 39) because of sharing and selling part of the ration and short duration of ration lasting, presence of ARI and poor personal hygiene (number of baths took per week) but it was similar to those studies conducted in Shimelba and Teferiber refugee camps (40).

A number of studies have demonstrated that malnutrition is associated with insufficient household food security, presence of disease like diarrhea, ARI, poor sanitation (25, 33,40, 47). In line with this, the study attempted to explores some of the contributing causes of malnutrition in the camp. The major factors attributed are insufficient household food security, childhood diseases like diarrhea and ARI, and poor environmental sanitation. Sharing of food ration with other families/neighbors and the insufficient provision of non-food items that forces refugees to sell part of ration to fulfill those needs (such as shoes, clothes, food utensils, etc.,) were also contributory findings to the reduced food intake.

According to the result obtained, the main source of food for the refugee population was from aid organization of the United Nations World Food Program given as food aid on monthly ration basis. The common staple food diets of the area are wheat grain, fortified blended food (corn soya blended), vegetable oil, pulse and sugar seems to be adequate to provide the calorie when the donated food is consumed. Nevertheless, there appear to be deficiencies in some micronutrients and this require the attention of the Donors. To complement their diet, some of the refugee's sell part of the ration they received and buy other staple food items such as milk

and other food types to provide varieties of food to their children. There is also adequate child caring practices mainly on immunization, vitamin A supplementation, child feeding (duration of EBF and BF), health care seeking, and feeding programmes in the camp.

In this study, stunting was associated with child age and paternal formal education in both bivariate and multivariate analysis. This shows that child age and paternal education were the main factor for chronic nutritional problem.

Both independent and adjusted analysis indicated that child sex, age of child, presence of ARI and lack of toilet facility were determinants of underweight. Also presence of diarrhea and maternal education were found significant factors of underweight in bivariate analysis.

In the crude analysis, the number of baths a child took and child ages were associated with wasting. Nevertheless, in adjusted analysis wasting was associated with the duration of ration lasting and presence of ARI after controlling for potential cofounders. The study undertaken in Southern Sudan (2007) found that malnutrition is associated with limited availability of food, high burden of infectious diseases and poor sanitation (33).

Therefore, the interpretation of the findings and the result from the odd ratios suggest that inadequate food availability, childhood illness such as diarrhea and ARI, and poor environmental sanitation are the primary causes of malnutrition in the camp. Most of these findings were in agreement with other studies undertaken; high immunization coverage, child feeding and health care seeking behavior at the HH and refugee community levels imply similar rates of reduction in malnutrition (21,40).

Since all refugees receive uniform services such as monthly general ration, health care, and other services, there is no difference among the refugees by social class particularly in income levels, in health care seeking behavior and also by seasonal variations in food production.

Provision of adequate fortified foods, good health care services such as immunization, vitamin A supplementation, access to health care and health care seeking during sickness, better child feeding practices and enhanced adult female education, would reduce the prevalence of child malnutrition.

The prevalence of stunting was higher among illiterate mothers than literate mothers suggesting education enabled women to provide appropriate care for children.

A study conducted (2004) by WFP at four countries across four different camps, in different parts of the world with protracted refugee situations in Bangladesh, Kenya, Tanzania and Nepal

identified that the relationship between protracted refugees that have malnutrition less than 10% global acute malnutrition and those that have higher than acceptable rates. Similarly, in this study, the inclusion of fortified blended foods associates with lower levels of stunting among populations receiving that food aid, well balanced food basket in terms of fat, protein, and energy does not alone guarantee positive nutrition outcomes (but improve ration with micronutrient), a well functioning health care system with both curative and preventive services is associated with low prevalence of malnutrition, living conditions (shelter, water and sanitation) affect malnutrition rates with a positive correlation and these issues are absolute: if refugees do not receive timely, adequate and appropriate food and care, their malnutrition rate will increase (12).

The above finding of this study was also further supported by WFP/UNHCR reports of the Joint Assessment Mission (June 2005) of the Congolese refugee in Burundi found that refugees sale some of their commodities to meet other food and non-food requirements (47).

This study finding is also consistent with the Joint UNHCR/WFP Nutrition Assessment Mission to refugee camps in Ethiopia (December 2005) which showed that inadequate food, insufficient micronutrient supply in ration provided, poor health condtitons realted to inadequate supply to potable water, infections and sale of ration to fulfill the non-food items) as an important risk factor for malnutrition (48). Children from the HHs that do not sell their ration had a lower risk of being under weight (wasted) than those children from HHs that sell/share part of their ration. The reason may be that HHs that do not sell part of their ration may provide adequate food to their children than those HHs that sell their ration.

The United Nations Standing Committee on Nutrition report (2003) on the nutrition situation of refugees and displaced populations also identified the risk factors affecting nutrition such as household resources, food security, access to health care/services, women's role and status, water, sanitation, shelter, overcrowding, paternal education and information on mothers nutritional knowledge as key determinants of growth faltering. Social and care environment such as social organizations and networks/communications are also important determinants of malnutrition (38).

6. 2. ANAEMIA

The overall prevalence of anemia among the study participants was 52.4%, a value higher than the public health categorization by WHO (> = 40%) [45]. The prevalence of severe anemia was 10.5%. Childhood anemia is a significant public health problem and is considered the most prevalent micronutrient deficiency in refugee populations (16,17,19,31).

Although there are many nutritional and non- nutritional causes of anemia worldwide, iron deficiency is the usually nutritional disorder that can produce such high prevalence of anemia. Generally, in areas where the prevalence of anemia exceeds 30-40%, the majority of anemia is caused in part or exclusively by iron deficiency (11, 13,17, 34).

To determine the risk factors that attributed to anaemia, binary logistic regression analysis was performedt. Accodingly, anemia was associated with child age, underweight, and with the number of under five children found in the HH in both multivariate and bivariate analysis. But in independent analysis maternal and paternal illiteracy, sharing and selling of ration, duration of ration stayed, diarrhea, personal hygiene of the child (child washing) and stunting were found to be significant risk factors of anemia. Other factors including malnutrition were found to aggravate or impact the outcome of anemia in refugee children. The findings of this study are consistent with previous studies conducted in Palestinian refugee camps that explored the association of anemia with the current/recent diarrhea or history of diarrhea 2 weeks before, stunting, maternal illiteracy and childe age (49).Previous studies conducted in Burma refugee camps also found that child age, duration of ration that does not last until the next ration delivery, and paternal illiteracy were associated with anemia (17).

The studies done in Occupied Palestinian territory among refugee pre-school children and Burma refugee camps also found that children below 24 months of age were more likely to have anemia suggesting that late infancy and early childhood (particularly children between 6-24 months) are high risk periods for iron deficiency because of rapid growth spurts and diets that are relatively low in iron content, and then falls as iron requirement decline and iron intake is increased through complementary foods (13,17,51).

This study is also consistent with the study conducted in under five children in rural areas of Indonesia which revealed that current diarrhea or history of diarrhea in previous 2 weeks was significantly associated with anemia. Those considered anemic were more likely to be younger, stunted, underweight, from families with low maternal and paternal education (50).

Additionally, previous studies have shown that anemia is a major public health problem in populations dependent on long term international food aid and humanitarian assistance. The review of study of five cross –sectional surveys conducted in five camps in Long -Term African refugees showed serious concerns regarding micronutrient malnutrition and indicated that the prevalence of anemia in children ranged from 12.8% up to 72.9% among the different camps (19). Similarly, the study undertaken in Burma showed that the prevalence of anemia was 72% among refugee children (17). The other study done in rural area of Indonesia also shown that anemia rate was 56.1% (50). The study conducted in Palestinian refugee camps also showed that the prevalence of anemia was 67% (49). These implies that the burden of anemia in the refugee communities were high and above the acceptable levels/rates.

This study supports the previous studies by demonstrating that anemia is a significant public health problem in emergency situations, and is associated with socio-demographic, child related variables, and environmental health conditions.

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1. Strengths

- Many different variables considered to be causes or differentials of child malnutrition and anamia were assessed and analyzed to characterize their relative contribution for the nutritional outcomes.
- Standared and valid questionnaires used in other studies were adapted for this study.

7.2. Limitations

- As the study is cross–sectional design with analytic component, it doesn’t represent seasonal variation of nutritional outcomes especially to the wasting/anaemia status nor establishes causal relationship.
- Measurement bias like inaccurate measurements may have occurred in some cases.
- Some measurements may not be accurate due to subjective responses and recall bias from the respondents based on the reminiscence of the mothers/care takers, and
- Possible selection bias could have occurred in selecting one child from a household.

8. CONCLUSION AND RECOMMENDATIONS

8.1. CONCLUSION

Malnutrition

Based on the findings of this study it is possible to conclude that acute and chronic nutritional problems are poor according to WHO classification while underweight is at serious stage alarming to increases mortality of children. Overall, the state of nutrition in the area is much better than those familiar surveys in other refugee camps.

In bivariate analysis both maternal and paternal lack of educational, family size and childe age were important determinants of stunting.

Child sex, age, maternal lack of education, diarrhea, ARI and lack of toilet facility are significant factors of underweight.

Child age, sharing of food ration with other families, selling part of the ration, insufficient household food availability (short duration of ration stay in HH), ARI and child personal hygiene (number of baths took) were key determinants of wasting.

Anemia

This study confirmed a high prevalence of anemia in the study subjects. Anaemia is independently associated among children under five years living in refugee camps whose families faced or experienced a major reduction in household food security, who are stunted, underweight, with fewer frequency of baths (poor personal hygiene), and in HHs that had 2 and above under five children.

8.2. RECOMMENDATIONS

- Intervention initiatives should focus on improving HH food security, fortification of ration foods with micronutrients, provision of non-food items, support income generation, nutrition education, and promotion of education of women.
- Prevention and control of childhood illness through improving environmental health conditions such as provision of safe and adequate water (potable water), prevention of contamination of food and water, housing sanitation and hygienic practices, and health care services and immunization.
- Improved good feeding practices among mothers: such as the introduction of quality complementary feeding at six months of age, or early iron supplementation, fortification of commonly eaten foods,
- Improved multi-sectorial collaboration of aid organizations to solve the multi-faced causes of child malnutrition.
- The health care professionals should look for anaemia in certain groups such as stunted, underweight children, children whose families last their food ration early before the expected time and those children who had diarrhea.
- Short term iron supplementation is necessary until donated food is fortified or enriched with vitamins and minerals,
- Further research to characterize causes of malnutrition and anaemia in different refugee camps such as micronutrient deficiencies, is also necessary.

REFERENCES

1. World Health Organization, Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva 1999.
2. World Health Organization. Global strategy on diet, physical activity and health. WHA57/17, 22 May 2004.
3. Government of India, Ministry of Women and Child Development. Working Group on Development of Children for the 11th Five Year Plan (2007 - 2012). Volume one. New Delhi, June 2006.
4. Severin J, CEM 99 - 7 (Asia Pacific School of Economics and Management Working Paper). Complex emergencies. An exploration of the impact of malnutrition in refugee camps. 1999
5. World Health Organization. Infant and young child nutrition. Global strategy for infant and young child feeding. WHA 55/15, 16 April 2002.
6. World Health Organization. Global strategy for infant and young child feeding. Geneva 2003.
7. World Health Organization. Infant and young child nutrition and progress in implementing the international code of marketing of breast milk substitutes. Report by the secretariat. 15 January 2004.
8. World Health Organization. Infant and Child nutrition: Quadrennial report. WHA 59/13. 4 May 2006.
9. Sprinkles Global Health Initiative. Micronutrient sprinkles for use in infants and young children: Guidelines on the recommendations for use and program monitoring and evaluation. December 2008.
10. Adamson P. (The Micronutrient Initiative and UNICEF). Vitamin and mineral deficiency. A Global Progress report. 2004.
11. World Health Organization. Worldwide prevalence of anemia 1993–2005. WHO Global Database on Anemia. Geneva 2008.
12. UNHCR/WFP. A Global Nutrition Strategy: Acute Malnutrition in Protracted Refugee Situations: January 2006.
13. Black E, Allen H, Bhutta A, et al. maternal and child undernutrition: Global and regional exposures and health consequences. www.thelancet.com. January 17, 2008. Available at: http://www.who.int/nutrition/topics/lancet series_undernutrition.pdf.
14. UNICEF. Progress for children. A report card on nutrition. New York. Number 4, May 2006. available at: http://www.unicef.pt/18/progress_for_children_ _ No._4.pdf.
15. Government of India, Ministry of Women and Child Development. 11th Fifth Year Plan. Report of the Working Group on Integrating Nutrition with Health. November 2006.

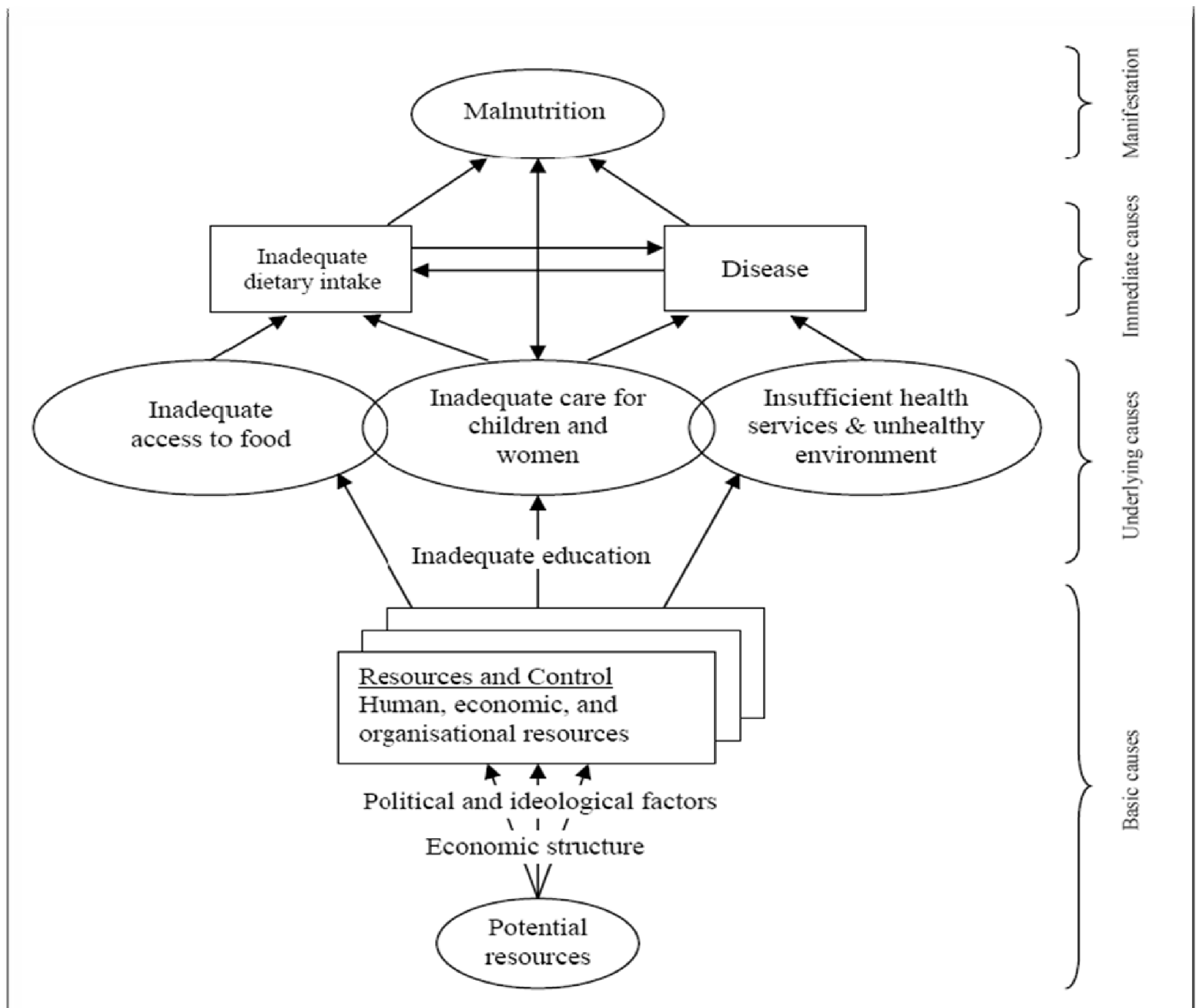
16. Dye D. Contemporary Prevalence and Prevention of Micronutrient Deficiencies in Refugee Settings Worldwide. Journal of Refugee studies, March 1, 2007; 20(1): 108 – 119.
17. Kemmer M, Bovill E, Kongsomboon W, et al. Iron deficiency is unacceptably high in refugee children from Burma. J. Nutr., December 1, 2003; 133(12): 4143 - 4149.
18. Shoham J. Assessing the impact of humanitarian assistance. A review of methods in the food and nutrition sector.
19. Seal J, Creeke I, Mirghani Z, et al. Iron and vitamin A deficiency in Long – Term African Refugees. J. Nutr., April 1, 2005; 135(4): 808 - 813.
20. Toole, M. J. and Waldman, R.J. Refugees and displaced persons: war, hunger and public health. Journal of the American Medical Association, 1993; 270(5):600-5.
21. Goette J. Issues in Nutrition for Refugee Children. November 2005.
22. World Food Program (WFP). Policy issues. Nutrition in emergencies: WFP experience and challenges. Rome, May 2004.
    Available at: http://docustore.wfp.org/stellent/group/public/documents/eb/wfp030136.pdf.
23. UNHCR/WFP. Micronutrient power use and outcomes in refugee camps in Nepal Asia. Issue 1. Number 1. May 2009.
24. Administrative for Refugee and Returnee Administration (ARRA). Statistical data. June 30, 2009; 3(11) Addis Ababa
25. WFP. Project Number: PRRO 10127.2. Food Assistance to Sudanese, Somali, and Eritrean Refugees. C ountry Ethiopia. March 2006.
26. United Nations Children's Fund (UNICEF). East Asia and Pacific Regional Office Health and Nutrition Working Paper. Strategy to reduce maternal and child undernutrition. Bangkok 2003
27. World Health Organization. Severe Malnutrition: Report of a consultation to review current literature 6 -7 September 2004. Geneva
28. Government of India, Planning Commission. Report of the steering committee of nutrition. New Delhi, December 2000.
29. Prudhon C, Briend A, Weise Z. et al (United Nations University). Community – based management of severe malnutrition in children. Food and nutrition bulletin, 2006; 27(3).
30. World Health Organization. Global strategy for infant and young child feeding. The optimal duration of exclusive breastfeeding.WHA 54, 1 May 2001
31. World Health Organization. Iron Deficiency Anemia. Assessment, Prevention, and Control. A guide for programme managers. 2001.
32. World Bank Seminar Series. Global Issues Facing Humanity. Agriculture and Rural Development: Hunger and malnutrition. Available at http://site resources.world bank.org/EXTRA BOUTUS/RESOURCES/Kevin Cleaver_ Paper. Pdf.

33. Harvey P, Rogers B. Nutritional status and its determinants in Southern Sudan: A summary of available data. [A2Z Project Academy for Educational Development] Washington, DC, October 2007
34. Simba D, Bloem W. Nutrition and health in developing countries. 2001; 393 – 415.
35. United Nations System Standing Committee on Nutrition. The impact of high food prices on maternal and child nutrition. Rome, 14 - 17 October 2008.
36. World Bank/UNICEF. Nutrition Assessment. Background Papers. September 2002.
37. United Nations Higher Commissioner for Refugees (UNHCR), Public Health and HIV Annual Report 2008. Geneva
38. United Nations Standing Committee on Nutrition. Refugee Nutrition Information System (RNIS), No. 41 – Report on the Nutrition Situation of Refugees and Displaced Populations. April 2003.
39. Nwagboso C. An evaluation of the nutritional status of refugee children in Osire refugee camp, Namibia. November, 2004.
    Available at: http://etd.uwc.ac.za/usrfiles/modules/etd/docs/etd_init_8812_117690336_pdf.
40. Joint UNHCR, ARRA and WFP. Health and nutrition survey in all refugee camps in Ethiopia. June to August 2008.
41. Walter W. Nutritional Epidemiology; second ed. 1998; 244 – 245.
42. Gibson S., Principles of nutritional assessment. 1990;m 163 – 174.
43. Dusch E, Galloway R, Achadi E, et al. Clinical screening may be a cost – effective way to screen for severe anemia. United Nations University Press, Food and nutrition bulletin, December 1999; 20 (4): 409- 416.
44. UNFPA. GBV Assessment report Kebribeyah refugee camp, Somali region, and Shimelba refugee camp, Tigray region, Ethiopia. 19 Feb- 6 Mar 2007.
45. WFP and CDC. Amanual: Measuring and interpreting malnutrition and mortality. November 2005.
46. Medecins Sans Frontrieres. Nutrition guidelines. 1st edition, 1995.
47. WFP/UNHCR. Report of the joint assessment mission of the Congolese refugee in Burundi. 27-30 June 2005.
48. Mary Corbett and Allison Oman, Addressing High Malnutrition Rates in Protracted Refugee Situations: The Nutrition and Food Security Situation in Selected refugee camps in Ethiopia, January 2006, Addia Ababa.
49. Hassan K, Sullivan M.K, Yip R, et'al. Factors associated with anaemia in refugee children.J. Nutr. 1997; 127: 2194-2198.
50. Howard T. C, Pee D.S, Sari M, et'al. Association of diarrhea with anaemia among children under age five living in rural areas of Indonesia. April 2007.
51. Halileh S, Gordon H.N. Determinants of anaemia in pre-school children in the occupaied Palestinian territory. June 2005.

ANNEXES

ANNEX 1: CONCEPTUAL FRAMEWORK

Figure 5: Conceptual Framework for Understanding the Causes of Malnutrition and Anemia



Source: United Nations System Standing Committee on Nutrition

ANNEX 2: NUTRITIONAL INDICES

Nutritional index	Description	Use
Weight for height (W/H) Or wasting	- WFH reflects recent weight loss or gain and so is the best indicator to determine wasting and an individual's recent dietary intake - It is also used when age is unknown	- is used to assess acute nutritional survey and is a measure of acute or short term exposure - usually preferred indicator for surveys in emergency situation
Weight for age (W/A) Or underweight	- WFA is a composite index as it reflects a combination of both wasting and stunting. It is used generally as a measure of underweight - is a composite indicator of nutritional status and is used to assess nutritional status over time	- WFA growth charts are used to monitor the weight gain of children in MCH programmes as in growth monitoring using 'Road-to-Health' Cards.
Height for age (H/A) (stunting)	- is an indicator of stunting in growth and reflects longer-term effects	- HFA is the best indicator of stunting and stunted growth determination
Mid-Upper-Arm Circumference for age or length/height (MUAC)	- References are used to calculate arm circumference measurements as MUAC-for-age/or height	- MUAC can be used as a quick but less accurate method of initial screening, especially when scales are not available. It measures wasting.

Source: World food program

ANNEX 3: DEFINITION OF STANDARDS FOR CALCULATION OF NUTRITIONAL STATUS

	Type of malnutrition			
	Well nourished	Mild malnutrition	Moderate malnutrition	Severe malnutrition
Oedema	No	No	No	Yes
Weight-for-height	90-120% (+2 to -1 SD)	80-89% (-1 to –2 SD)	70-79% -2 to –3 SD	<70% (<-3 SD) severe wasting
Height-for-age	95-110% (+2 to –1 SD)	90-94% (-1 to-2 SD)	85-89% (-2 to –3SD)	<85% (<-3SD) (severe stunting)
Weight-for-age	(+2 to >-1 SD)	(-1 to > -2 SD)	60-80% (-2 to –3 SD)	<60% (-3 SD) Severe underweight

ANNEX 4: DEFINITION OF HEMOGLOBIN (Hb) LEVEL AND PALLOR

DEFINITION OF HEMOGLOBIN (Hb) LEVEL		
Hemoglobin (Hb) level (concentration) in g/l		Degree
Hb > 11g/dl		Normal
Hb <11 g/dl		Moderate
Hb < 8 g/dl		Severe
DEFINITION OF PALLOR		
Clinical examination site	Gold standard (Biochemical)	Hb cut – off points
Conjunctivae	HemoCue	Hb < 11g/dl
Nail beds	HemoCue	Hb < 11g/dl
Palms	HemoCue	Hb < 11g/dl
Face	HemoCue	Hb < 11g/dl
Skin	HemoCue	Hb < 11g/dl

ANNEX 6: STUDY INFORMATION SHEET AND CONSENT FORM

This study information sheet and consent form are prepared for collecting information on child nutritional status and prevalence of anaemia and their determinants in Kebribeyah refugee camp, Somali region, Ethiopia.

Study Information Sheet

Introduction

Hello my name is______ and I'm working as a data collector in survey conducted by the collaboration of Addis Ababa University, Medical Faculty, School of Public Health, to assess malnutrition and anemia and their determinants of your family. I would very much appreciate your participation in this survey. I would like to ask you about the health of your children. We will also take blood samples, weigh and measure the height of your children who are less than 5 years of age. The interview will take 30 minutes to complete.

Benefits: For all participants assessed, we will give information and/or feedback on the results of hemoglobin. In addition to, health and nutrition advice, we will also refer sick and severely malnourished children to health facilities and to nutirition rehabilitation center.

Risks: We will follow strict procedures to ensure you come to no harm through giving blood (during taking blood samples). The needle (lancet) used may hurt a little, but only for a short while. Occasionally, people faint (shock) when blood is taken, but we are using trained (experiencing) staff to minimize the chance of this. The amount of blood taken is about 0.002ml (20μl).

Autonomy and confidentiality: Your child name will be written on this form and the information will be used for intervention purpose. However, the information will be kept strictly confidential. Participation in this study is voluntary and you don't give any answer for questions that you don't want to answer and you may stop the interview at any time you want. However, I hope that you will participate in this study since your views are important.

Do you have any questions about the study?

Contact address:

If you want to contact the principal investigator about any aspect of this study, please contact:

Ato Yasin Jemal Yasin (Mobile 09 12 07 58 05)

School of Public Health, Medical Faculty, Addis Ababa University.

Consent Form

1. I confirm that I have understood the information sheet

2. I have been offered the opportunity to ask questions.

3. Are you willing to take part in this study? Or May I begin the interview now? (Make “X”)

   Yes ☐ No ☐

Signature or thumbprint of participant: ____________________________________

Interviewer’s name: _____________________________________

Date of interview DD ______ MM ______ YYYY ________.

ANNEX 7: QUESTIONNAIRE

PART 1: SOCIO –DEMOGRAPHY CHARACTERISTICS (QUESTIONS FOR HH HEAD)		
S. No.	Question	Response
1.1.	Head of household	A = Male B= Female
1.2.	Time in camp	____DD ____MM _____YYY
1.3.	Age	____DD ____MM _____YYY
1.4.	Religious	
1.5.	Ethnicity	
1.6.	Marital status	A=Married B=Divorced C=Widowed D=separated
1.7.	Number of people living in the household	
1.8.	Number of children under 5 in the household	
1.9.	Maternal education: Have you ever attended basic education?	A=Yes B= No (If No, skip to 1.11)
1.10.	What is the highest grade you completed	A= 1-4 B= 5-8 C= 9-12 D= Vocational certificate E= Diploma F=Degree N= Other specify __________
1.11.	Have you ever attended informal education?	A= Yes B= No (If no, skip to 1.13)
1.12.	Are you able to read and write? (Mother)	A= Yes B= No
1.13	Paternal education: Have your husband ever attended basic education	A= Yes B= No (If no, skip to 1.15)
1.14	What is the highest grade you completed	A= 1-4 B= 5-8 C= 9-12 D= Vocational certificate E= Diploma F=Degree N=Other specify__________
1.15	Have you ever attended informal education?	A= Yes B= No (If no, skip to 1.17)
1.16	Are you able to read and write? (Father)	A= Yes B= No

1.17	Occupation of mother (if any) (More than one answer is possible)	A= Merchant B= Daily labor C= NGO employee D= Housewife E= None N=Other specify________
1.18	Occupation of husband (if any) (More than one answer is possible)	A= Merchant B= Daily labor C= NGO employee D= None N=Other specify

1.19	Monthly income of the Household in Birr (USD)	
1.20	Who decides the money you earn to be used?	A = Mainly spouse B = Mainly husband C = Only husband D = Both jointly
1.21	Do you have some control and power (autonomy) in decision-making?	A= Yes B= No M = Do not know/not sure
1.22	Number of people receiving ration	
1.23	Does child receive ration	A= Yes B= No

PART 2: DIETARY INFORMATION

2.1.	What food staple do you usually eat at this time of year? Make "X".						
	Wheat	Rice	Peanuts	Maize	Sorghum	Cassava	Other
2.2.	What was your food staple in the last 4 weeks? Make "X".						
	Wheat	Rice	Peanuts	Maize	Sorghum	Cassava	Other

2.3.	Where do you usually get your main source of food this time of year? Make "X".				
	Own production	Borrowed	Bought	Bartered	Free Food
2.4.	Where did your main source of food come from in the last 4 weeks? Make "X".				
	Own production	Borrowed	Borrowed	Bartered	Free Food

<table>
<tr><td rowspan="3">2.5.</td><td colspan="5">Where will your main source of food come from in the next 3 months? Make “X”.</td></tr>
<tr><td>Own production</td><td>Borrowed</td><td>Bought</td><td>Bartered</td><td>Free Food</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.6.</td><td colspan="3">Has your household received a general ration within the last 6 months?</td><td colspan="2">A= Yes B=No (If No, skip to question 2.16)
M= Unknown</td></tr>
<tr><td>2.7.</td><td colspan="3">How long did it take the last time to get the general ration?</td><td colspan="2">__________ Hours</td></tr>
<tr><td>2.8.</td><td colspan="3">How long did it stay the general ration that you get?</td><td colspan="2">__________ Days</td></tr>
<tr><td rowspan="3">2.9.</td><td colspan="6">In which months did you receive a general ration? Make “X”.</td></tr>
<tr><td>October</td><td>November</td><td>December</td><td>January</td><td>February</td><td>March</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">2.10.</td><td colspan="6">During the last distribution, how much of the following items did your household receive?</td></tr>
<tr><td colspan="6">_____ Kg Wheat _____Kg Rice _______ Kg Maize ______ Kg Sorghum
______Lt Oil ______ Salt _____Green Peas ____Beans _____ others, specify</td></tr>
<tr><td>2.11.</td><td colspan="3">Was the entire ration consumed by your household?</td><td colspan="3">A=Yes (If Yes, skip to 2.14) B=No
M=Unknown</td></tr>
<tr><td>2.12.</td><td colspan="3">Did you share your ration with other families or neighbors?</td><td colspan="3">A =Yes B=No M=Unknown</td></tr>
<tr><td>2.13</td><td colspan="3">Did you sell or trade part of the ration?</td><td colspan="3">A=Yes B=No M=Unknown</td></tr>
<tr><td>2.14.</td><td colspan="3">Are you able to cook at home?</td><td colspan="3">A=Yes (If Yes, skip to 2.16)
B=No (If No, skip to 2.15)
M=Unknown (Skip to part 2.16)</td></tr>
<tr><td rowspan="3">2.15.</td><td colspan="6">If No, Why not? Make “X”.</td></tr>
<tr><td>No food</td><td>No pot/pans</td><td>No fuel</td><td colspan="3">Other</td></tr>
<tr><td></td><td></td><td></td><td colspan="3"></td></tr>
<tr><td>2.16.</td><td colspan="3">Do you have any animals now?</td><td colspan="3">A=Yes (If Yes, skip to 2.17) B=No</td></tr>
<tr><td rowspan="3">2.17.</td><td colspan="6">State type and number? (Make ‘X’ and write the number)</td></tr>
<tr><td>Goat</td><td>Sheep</td><td>Equines</td><td>Cattle</td><td>Camel</td><td>Other</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

PART 3: CHILD CHARACTERISTICS AND CARING PRACTICES		
3.1.	Time in camp	____DD_____MM____YYY
3.2.	Age	___DD ____MM____YYYY
3.3.	Sex (Circle one)	M / F
3.4.	Place of delivery (Circle one)	A= Home B= Health institution N= Other (specify)
3.5.	Birth weight	_______ Kg
3.6.	Currently enrolled in	A=SFP (Skip to 3.9) B= TFP (skip to 3.9) C= Not enrolled in any feeding center (If Not enrolled, skip to 3.7)
3.7.	Did the child ever attend feeding center	A= Yes B=No (If No, skip to 3.10)
3.8.	If yes, how long did the child attend the programme?	_________number of days
3.9.	What problems did you (parent/child) experience while on the feeding center programme? Or any positive thing you observe?	
3.10.	Does the child ever been immunized?	A=Yes B= No (If No, skip to 3.12)
3.11.	Vaccines received (See card, if no card available ask them to recall) (More than one answer is possible)	A= BCG only (See Scar) B= DPT C= Measles D= Polio
3.12.	Has the child received Vitamin A	A= Yes (If Yes, __ DD __MM___YYYY) B= No M= Don't know/not sure
3.13.	What are the most frequent disease problem of the child	_________Disease/s M= Don't know
3.14.	Since 2 weeks ago had this child had Diarrhea	A=Yes B=No (If No, skip to 3.17) M=Do not know/not sure (If don't know, skip to3.17)
3.15.	How frequent per year	__________ times
3.16.	Was there blood in it?	A=Yes B = No M = Unknown
3.17.	Since 2 weeks ago had this child had: Difficulty breathing or respiratory disease?	A=Yes B= No M = Don't know/not sure
3.18.	Has the child been sick by malaria within last two weeks?	A=Yes B= No M= Don't know/not sure

3.19.	Has the child get sick with measles in the last six months	A=Yes B= No M = Don't know/not sure
3.20.	Presence of oedema both feet	A=Yes B= No
3.21.	Is this child's biologic mother alive?	A= Yes B= No (skip to part 3.36) M= Unknown (skip to 3.36)
3.22.	Is the child breastfeeding	A=Yes (If Yes, skip to 3.25) B=No
3.23.	Have you ever breast fed the child	A=. Yes (If Yes, skip to 3.25) B= No
3.24.	If no, why?	Reason:
3.25.	Time in which breast feeding started after birth	A= Immediately B ____ Hours (If < 24hours record) C ____ Days M =Don't know/not sure
3.26.	Did you give the child pre-lactation food/fluid?	A=Yes B= No (If No, skip to 3.29)
3.27.	If yes, what did you gave him (her)?	A=Water B= Butter C= Cow's milk D= Powder milk E= Sugar solution F = Tea N= other (Specify) _____
3.28.	Are you still breastfeed?	A=Yes B=. No
3.29.	How many times within 24 hours you breastfed?	____ times at 24 hours ____ times at day time _____ times at night time
3.30.	Did you give the child additional food or fluid other than breast milk?	A=Yes B= No (If No, skip to 3.34)
3.31.	If yes what type of food or fluid?	A=Cow's milk B= Powder milk C= Sugar solution. D=Tea E = Bread N= Other (specify)
3.32.	How many times do you give additional food within 24 hours?	_____times at 24 hours _____ times at day time ______ at night time
3.33.	At which age did the child start taking additional food	________ month

3.34.	How many months did you breast-feed the child?	_____ Months M= Don't know/not sure
3.35.	For how many months did you exclusively breast-fed the child?	_____ Months M= Don't know/not sure
3.36.	How many times did the child washed per week	A= daily B= Twice C=Every other day D= Once a week N=Other /Specify
3.37.	where did you take your child in case of sickness	A= Usually home treatment B=Taking to traditional healers C= Taking to Health institution N =Other (Specify) _____
3.38.	Have you ever take your child to health center	A =Yes B = No
3.39.	Since 3 months ago is there a child died	A = Yes B = No (If No, skip to part 4)
3.40	If Yes, what is the cause of death (write)	

	PART 4: ANTROPOMETRIC MEASUREMENT				
		Age	Sex (circle one)	Result	Remark
4.1.	Child weight in kilogram (Kg)		M / F		
4.2.	Child height in centimeters (cm)				
	PART 5: HEMOGLOBIN MEASUREMENT (LEVEL) AND PALLOR				
	5.1 HEMOGLOBIN MEASUREMENT (LEVEL)				
		Age	Sex (circle one)	Result	Remark
5.1.1	Child hemoglobin level in gram per litter (g/l)		M / F		

5.2 PALLOR ASSESSMENT					
Examination site and presence of pallor		Age	Sex (circle one)	Result. Make "X"	Remark
5.2.1	Conjunctivae		M / F		
5.2.2.	Nail beds				
5.2.3	Palms				
5.2.4.	Face				
5.2.5	Skin				

PART 6: FAMILIES/CARE TAKER CHARACTERISRICS		
6.1.	Families/caretaker ages age in years	_____Years
6.2.	Age at first birth	_____ Years
6.3.	Total number of children ever born?	_______ number
6.4.	Weight during pregnancy	______ kg M= Don't know/not sure
6.5.	Health status during the pregnancy	A= Good B= Not good/sick
6.6.	Did you visit health facility for antenatal care (ANC)	A Yes B=No (If No, skip to 6.9)
6.7.	At what months of the pregnancy you started ANC	At ______ months M. Don't know/not sure
6.8.	Number of ANC visits during pregnancy	_______ times
6.9.	Do you know family planning	A=Yes B= No (If No, skip to 6.11)
6.10.	Have you ever used family planning methods	A=. Yes B= No
6.11.	When do you usually wash your hands? (possible more than one answer)	A= Before and after preparing food B=.Before serving food C= After cleaning child feaces D= After latrine use N= Other (specify) _______________
6.12.	How do you wash your hand?	A=Using water only B= Using soap sometimes C= Using soap always D. Using ash/soil some times

PART 7: ENVIRONMENTAL HEALTH		
7.1.	What is your main source of water? Circle more than one	A= Piped water B= Protected well C= Unprotected well D= River, lake, dam E= Spring protected F= Spring unprotected G=Rain water N= Other, specify ______
7.2.	How long did it take you to collect water (the time taken to fetch water)? Circle one	A = < 15 minutes B = 15 – 30 minutes C = 30 minutes – 1 hour D = > 1 hour
7.3.	Daily water need for the household?	A= < 20 Lt B =20 - 40 Lt C= > 40 Lt M=Don't know
7.4.	Do you use water treatment to make safe the water?	A=Yes B= No
7.5.	Do you have water collection material (receptacle)?	A= Yes B= No (If No, skip to 7.7)
7.6.	If Yes, what type of water collection material?	A= Plastic jars B= Jeri cans C= clay pot D= Roto N. Other, specify: ________
7.7.	Do you have toilet facility?	A=Yes B= No (If No, skip to 7.9)
7.8.	If Yes, what kind of toilet facility do you have?	A= Traditional pit latrine B = Ventilated improved pit C = Flush latrine N= Other, Specify_____________
7.9	If No, toilet facility where do you defecate?	A = Open field B= Bush N= Other specify ___
7.10.	What type of shelter do you have?	A = Tent B= Plastic sheeting/other covering C= Hut/structural abode D = Nothing N= Other______
7.11.	How do you dispose solid waste disposal?	A= Burying B= Open dump C= Burning D= Communal pit

THANK YOU VERY MUCH

LIFAAQ 8: WARQADDA MACLUUMAADKA DARAASADDA IYO FOOMKA OGGOLAANSHAHA

Warqaddan macluumaadka daraasadda iyo foomka oggolaanshaha waxaa loo-diyaariyey si loogu ururiyo xaaladda nafaqada ilmahaaga iyo jiritaanka dhiig-yarida iyo arrimaha sababa ee ka jira xerada qaxootiga Qabribayax, Deegaanka Soomaalida, Itoobiya.

Warqadda Macluumaadka Daraasadda

Hordhac

Waadsalaamantahay. Magacayga waxaa la yidhaahdaa ___________________, waxaanaan macluumaad ururiye ka ahay daraasad si wadajir ah loola fulinayo Jaamicadda Addis Ababa, Kulliyadda Caafimaadka, Qaybta Caafimaadka Dadweynaha. Daraasaddu waa mid lagu baadhayo heerka nafaqada iyo dhiigyarada iyo arrimaha sababy ee qoyskaaga ka-jira. Waxaan aad u jeclahay in aad daraasaddan ka-qaybqaadatid. Waxaan doonayaa in aan caafimaadka carruurtaada wax kaa weydiiyo. Carruurtaada ay da'doodu ka yartahay 5 jir ah ka qaadaynaa muunado dhiig ah, waxaanu cabbiraynaa misaankooda iyo dhırarkooda. Weraysiga aynu ku yeelanayo wuxuu qaadan doonaa illaa 30 daqiiqo.

Faa'iidooyinka: Dhammaan ka-qaybqaatayaasha daraasadda waxaanu siin doonnaa macluumaadka iyo/ama natiijooyinka cadadka hemooglobiinka ee baadhitaanka ka soo-baxaysa. Tallooyinka caafimaadka iyo nafaqada ku-saabsan ee aynu ku siinayno waxaa dheer ilmahaaga xanuunsanaya iyo kuwa ay nafaqa-xumada ba'an hayso oo aynu u gudbin doonno xarumaha caafimaadka iyo xarumaha nafaqada.

Halisaha: Waxaanu adeegsan doonnaa hannaan taxaddar sare leh, kaas oo aynu ku xaqiijin doonno in muunadda dhiigga lagaa qaadayo ayna wax dhibaato ahi kaaso gaadhin. Irbadda (lancet) la isticmaalayo waxay yeelan kartaa xannuun aad u yar, laakiin taasi waa mid wakhti gaaban keliya ah. Waxaa marar dhif ah dhacda in qofka dhiigga laga qaadayo uu dawakho (shoog qaado), laakiin si aynu xaaladdan u yarayno waxaanu adeegsanaynaa shaqaale taba-baran (khibrad leh) Cadadka dhiigga la-qaadayo waa mid aad u yar oo ah illaa 0.002ml (20μl).

Madax-bannaani iyo qarsoodinimo: Waxaa magaca ilmahaaga lagu qori doonaa foomkan, macluumaadkana waxaa loo adeegsan doonaa dadaalka dhibaatooyinka jira lagu xallinayo. Hase-yeeshe, waxaa macluumaadka loo xafidi doonaa si adag oo qarsoodi ah. Ka-qaybqaadashada daraasaddani waa mid ikhtiyaarkaaga ku-salaysan, waxaanad heli kartaa in aad ka-jawaabi waydo su'aal kasta oo aanad doonayn in aad ka-jawaabtid, waxaanad xor u tahay in aad markasta oo aad damacdid iska-joojisid. Hase-yeeshe, maadaama aragtiyada lagaa helayo ay muhiim yihiin, waxaan rajaynayaa in aad daraasaddan ka-qaybqaadan doontid.

Miyaad qabtaa wax su'aal ah oo daraasadda la-xidhiidha?

Cinwaanka Xidhiidha:

Haddii aad doonaysid in daraasad wadaha sare aad kala-xidhiidhid arrin-kasta oo daraasaddan, fadlan waxaad la hadashaa:

Mudane Yaasiin Jemaal Yaasin (Tel Gacanta: 09 12 07 58 05)

Qaybta Caafimaadka Dadweynaha, Kulliyadda Caafimaadka, Jaamicadda Addis Ababa

Foomka Oggolaanshaha

1. Waxaan xaqiijinayaa in aan fahmay warqadda macluumaadka (xogta)
2. Waxaa la iisiiyey fursad aan su'aalo ku soo jeediyo.

3. Miyaad doonaysaa in aad daraasaddan ka-qaybqaadatid? Ama Miyaan imika bilaabi karaa waraysiga? (Saar calaamadda "X")

Haa ☐ Maya ☐

Saxeexa ama saxeexa suulka ee ka-qaybqaataha: ________________________________

Magaca waraystaha: ____

Taariikhda waraysiga: MM ______ BB ______ SSSS ___________

LIFAAQA 9: SU'AALAHA SAHANKA

QAYBTA 1: DABEECADAHA XAALADAHA BULSHEED IYO DADWEYNE (SU'AALAHA LA WEYDIINAYO MAS'UULKA QOYSKA)		
Tir.	Su'aasha	Jawaabta

1.1.	Mas'uulka Qoyska	A = Lab B= Dhaddig
1.2.	Taariikhda aad xerada timaaddeen	____MM ____BB _____SSSS
1.3.	Da'daada /Taariikhda dhalashada/	____MM ____BB _____SSSS
1.4.	Diintaada	
1.5.	Qoladaada	
1.6.	Xaaladdada guurka	A=Waan gursaday B=La-furay C=Uu ka-dhintay D=Kala-tagay
1.7.	Tirada dadka qoyskan ka tirsan	
1.8.	Tirada carruurta 5 jir ka-yar ee qoyska ka tirsan	
1.9.	Waxbarashada hooyada: Abid miyaad baratay waxbarashada aasaasiga ah?	A=Haa B= Maya (Haddii ay "maya" tahay u gudub 1.11)
1.10.	Waa maxay heerka ugu sareeya ee waxbarashada aad dhamaysatay	A= 1-4 B= 5-8 C= 9-12 D= Shahaada Farsamooyinka E= Diblooma F=Dhigrii N= Nooc kale, sheeg __________
1.11.	Abid miyaad bartay waxbarashada aan rasmiga ahayn?	A= Haa B= Maya (Haddii ay "maya" tahay u gudub 1.13)
1.12.	Miyaad karaysa akhrinta iyo qorista? (Hooyo)	A= Haa B= Maya
1.13	Waxbarashada aabbaha: Ninkaagu abid miyuu bartay waxbarashada aasaasiga ah?	A= Haa B= Maya (Haddii ay "maya" tahay u gudub 1.15)
1.14	Waa maxay heerka ugu sareeya ee waxbarashada aad dhamaysatay	A= 1-4 B= 5-8 C= 9-12 D= Shahaada Farsamooyinka E= Diblooma F=Dhigrii N= Nooc kale, sheeg __________
1.15	Abid miyaad bartay waxbarashada aan rasmiga ahayn?	A= Haa B= Maya (Haddii ay "maya" tahay u gudub 1.17)
1.16	Miyaad karaysa akhrinta iyo qorista? (Aabbo)	A= Haa B= Maya
1.17	Shaqada hooyada (haddii ay shaqayso) (Waxaa la-bixin karaa in ka-badan hal jawaab)	A= Ganacsato B= Xoogsato C= Shaqaale NGO D= Guri-joogto E= Ma-shaqayso N=Shaqooyin kale, sheeg _________
1.18	Shaqada ninka (haddii uu shaqeeyo) (Waxaa la-bixin karaa in ka-badan hal	A= Ganacsade B= Xoogsade C= Shaqaale NGO D= Guri-joogto

	jawaab)	E= Ma-shaqeeyo N=Shaqooyin kale, sheeg ________
1.19	Dakhliga qoyska bil-welba soo-gala waa imisa Birr (dollar) (Ka Maraykanka)?	

1.20	Yaa go'aan ka-gadhaa habka loo-isticmaalayo lacagta dakhliga?	A = Badanaa Xaaska B = Badanaa Ninka C = Ninka keliya D = Labadaba, si wada-jir ah
1.21	Illaa miyaad leedahay awoodda go'aaminta?	A= Haa B= Maya M = Magaranayo /Ma-hubo
1.22	Waa imisa tirada dadka raadhinka hela ee qoyskan ka-tirsan?	
1.23	Ilmuhu raashin miyey helaan?	A= Haa B= Maya
QAYBTA 2: XOGTA CUNNTADA		

2.1.	Waa maxay cuntada ee sanadkan aan inta-badan cunayseen? Saar calaamadda "X".						
	Qamandi	Bariis	Digri	Gallay	Masago	Kaasava	Nooc kale
2.2.	Maxay tahay cuntada aad inta ugu-badan cunaysay 4 toddobaad ee tagay? Saar calaamadda "X".						
	Qamandi	Bariis	Digri	Gallay	Masago	Kaasava	Nooc kale

2.3.	Sida qaalibka ah xillgan la-joogo ee sanadka waa maxay isha ugu weyn ee uu qoysku cuntadiisa ka helo? Saar calaamadda "X".				
	Beerta qoyska	Waanu soo daysanaa	Waanu soo iibsanay	Waxkalaan ku soo beddelanaa	Cuntada la-qaybiyo (bilaa lacag)
2.4.	Maxay ahayd isha ugu weyn ee uu qoysku cuntadiisa ka helayay 4 toddobaad ee ugu dambeeyay? Saar calaamadda "X".				
	Beerta qoyska	Waanu soo daysanaa	Waanu soo iibsanay	Waxkalaan ku soo beddelanaa	Cuntada la-qaybiyo (bilaa lacag)

<table>
<tr><td rowspan="3">2.5.</td><td colspan="5">Maxay noqon doontaa isha ugu weyn ee cuntada ee qoyska ee 3 bilood ee xiga? Saar calaamadda “X”.</td></tr>
<tr><td>Beerta qoyska</td><td>Waanu soo daysanaa</td><td>Waanu soo iibsanay</td><td>Waxkalaan ku soo beddelanaa</td><td>Cuntada la-qaybiyo (bilaa lacag)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.6.</td><td colspan="2">Qoyskaagu 6 bilood ee tagay miyuu helay raashinka guud?</td><td colspan="3">A= Haa
B=Maya (Haddii ay “maya” tahay u gudub 2.16)
M= Magaranayo</td></tr>
<tr><td>2.7.</td><td colspan="2">Markii ugu dambaysay muddo intee dhan ayey kugu qaatay helitaanka raashinka guud?</td><td colspan="3">__________ Saacadood</td></tr>
<tr><td>2.8.</td><td colspan="2">Raashinkii guud ee la idiin siiyay muddo intee dhan ayaad isticmaalayseen?</td><td colspan="3">__________ Maalmood</td></tr>
<tr><td rowspan="3">2.9.</td><td colspan="6">Bilahabaad qaadataan raashinka guud? Saar calaamadda “X”.</td></tr>
<tr><td>Oktoobar</td><td>Nofeembar</td><td>Dseembar</td><td>Jannaayo</td><td>Febraayo</td><td>Maarso</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">2.10.</td><td colspan="5">Markii ugu dambaysay ee raashinka la-qaybiyay, cadad intee dhan oo midhahan ah ayuu qoyskaagu qaatay?</td></tr>
<tr><td colspan="5">_____ Kg Qamandi _____Kg Bariis _______ Kg Galley ______ Kg Masago
______Lt Saliid ______ Cusbo _____Digir Cagaaran ____Atar _____ kuwa kale, sheeg</td></tr>
<tr><td>2.11.</td><td colspan="2">Dhammaan raashinkaas ma-waxaa isticmaalay qoyskaaga?</td><td colspan="3">A=Haa B=Maya M=Lama garanayo</td></tr>
<tr><td>2.12.</td><td colspan="2">Qaybta raashinka ee qoyskiina ma-gaarbaa la idiin siiyay mise waxaa la idiinku daray qoysas kale ama dadka dariska ah?</td><td colspan="3">A=Haa B=Maya M=Lama garanayo</td></tr>
<tr><td>2.13</td><td colspan="2">Miyaad iibisay ama ka-ganacsatay qayb raashinka ka mid ah?</td><td colspan="3">A=Haa B=Maya M=Lama garanayo</td></tr>
<tr><td>2.14.</td><td colspan="2">Miyaad awooddaan in aad guriga cuntada ku karsataan?</td><td colspan="3">A=Haa (Haddii ay “haa” tahay u gudub 2.16)
B=Maya (Haddii ay “maya” tahay u gudub 2.15)
M=Lama garanayo (U gudub qaybta 3)</td></tr>
</table>

2.15.	Haddii ay “Maya” tahay, Waa maxay sababtu? Saar calaamadda “X”..			
	Cunto ma-jirto	Dhari/Bir-daawo mahaysano	Xaabo/Shidaal majiro	Sababa kale

2.16.	Miyaad haystaan xoolo nool?	A=Haa (Haddii ay “haa” tahay u gudub 2.17) B=Maya

2.17.	Sheeg nooca xoolaha aad leedihiin iyo tiradooda? (Calaamadda ‘X’saar tiradana qor)					
	Riyo	Ido	Dameero, fardo, iwm	Lo’	Geel	kuwa kale

QAYBTA3: DABEECADAHA CARRUURTA IYO XANNAANAYNTOODA

3.1.	Taariikhda uu xerada ku soo biiray	____MM_____BB____SSSS
3.2.	Da’da (taariikhda dhalashada)	___MM ____BB____SSSS
3.3.	Jinsiga (Mid goobaab)	L / Dh
3.4.	Goobta uu imuhu ku-dhashay (Mid goobaan)	A= Guriga B= Xarun caafimaad N= Meel kale (sheeg)
3.5.	Miisaanka uu lahaa markuu dhashay	_______ Kg
3.6.	Wakhti xaadirkan xagguu ka-diiwaan-gashanyahay?	A=Barnaamijka Cuntada Dheeraadka ah B= Barnaamijka Dawaynta Nafaqada M= Ma-garanayo
3.7.	Ilmuhu abid miyuu tagay xarunta quudinta?	A= Haa B=Maya
3.8.	Haddii ay jawaabtu “haa” tahay, muddee intee dhan ayuu barnaamijkaasi ku jiray?	_________tirada maalmaha
3.9.	Muddadii aad joogtay xarunta barnaamijka quudinta (waalidka/ilmaha) maxay ahaayeen dhibaatooyinka aad la kulantay? Ama arrimaha wanaagsan ee aad la kulantay?	
3.10.	Ilmaha weligii miyaa la-tallaalay?	A=Haa B= Maya
3.11.	Tallaalka uu helay (Eeg kaarka tallaalka, haddii uusan kaar lahayn, weydii in ay xusuutaan)	A= BCG keliya (Eeg iinta tallaalka) B= DPT C= Jadeeco D= Dabaysha
3.12.	Ilmiuhu miyuu helay fitamiin A?	A= Haa (Haddii ay “haa” tahay, __ MM ___BB___SSSS) B= Maya M= Ma-garanayo /ma-hubo

3.13.	Muxuu yahay cudurka ilmaha aad ugu soo noqnoqda ee ku-dhaca?	__________Cudurka/da M= Ma-garanayo
3.14.	Ilmuhu miyuu shubamay 2 toddobaad ee ugu dambeeyay gudahood ?	A=Haa B=Maya M= Ma-garanayo /ma-hubo
3.15.	Ilmaa imisa jeer ayuu sanad-welba shubmaa?	___________ jeer /tirada/
3.16.	Shubunka dhiig miyuu la-socday?	A=Haa B = Maya M = Lama-garanayo
3.17.	2-dii toddobaad ee ugu dambeeyay ilmahani miyuu la-kulmay: Dhibaato xagga neefsashada ah ama cudur qaybta neef-mareenka ku dhaca?	A=Haa B=Maya M= Ma-garanayo /ma-hubo
3.18.	Labadii toddobaad ee ugu dambeeyay ilmuhu miyuu la-xanuusaday cudurka kaneecada?	A=Haa B=Maya M= Ma-garanayo /ma-hubo
3.19.	Lixdii bilood ee ugu-dambeeyay, ilmuhu miyuu la xanuunsaday cudurka jadeecada	A=Haa B=Maya M= Ma-garanayo /ma-hubo
3.20.	Miyuu ka-bararay labada lugood?	A=Haa B= Maya
3.21.	Ilmahan hooyadiis miyey nooshahay?	A= Haa B= Maya (U gudub qaybta 4) M= Lama-garanayo
3.22.	Ilmuhu imika miyuu naaska jaqaa?	A=Haa B=Maya
3.23.	Weligaa ilmaha naaska miyaad nuujisay?	A=. Haa B= Maya
3.24.	Haddii ay “maya”, sabab?	Sababta:
3.25.	Markuu dhashay kaddib, wakhtigii nuujinta naaska loo-bilaabay	A= Isla-markiiba waa loo-bilaabay B _____Saacadood (Haddii < 24 saacadood) C _____ Maalmood M= Ma-garanayo /ma-hubo
3.26.	Ilmaha miyaa la-siiyay cuntooyin/cabbitaan, ka-hor intaan nuujinta naaska loo-bilaabin?	A=Haa B= Maya
3.27.	Haddii la-siiyay, maxay ahayd cuntada ama cabbitaanka la-siiyay?	C= Caano lo’aad D= Caana boodha E= Sonkor biyo lagu qasay F = Shaah N= Kuwa kale (Sheeg) ______
3.28.	Weli miyaad naaska nuujisaa?	A=Haa B=. Maya
3.29.	24-kii saacadood ee ugu-dambeeyay, imisa jeerbaad	_____ jeer, 24 saacadood gudahood

	naaska nuujisay?	____ jeer, dharaarnimada _____ jeer, habeenkii
3.30.	Ilmaha miyaad siisay cunto ama cabbitaan dheeraad ah oo caanaha naaska ka-baxsan?	A=Haa B= Maya
3.31.	Haddii ay jawaabtu “haa” tahay, muxuu yahay nooca cuntada ama cabbitaanka la-siiyay?	A=Caano lo’aad B= Caana boodha C= Sonkor biyo lagu qasay. D=Shaah E = Furun N= Kuwa kale (sheeg)
3.32.	24-kii saacadood illaa imisa jeer ayaad cunto dheeraad ah siisaa?	____ jeer, 24 saacadood gudahood ____ jeer, dharaarnimada _____ jeer, habeenkii
3.33.	Ilmuhu da’deebaa loogu bilaabay cuntooyin dheeraad ah?	________ Bilood
3.34.	Imisa biloodbaad naaska nuujisay?	_____ Bilood M= Ma-garanayo /ma-hubo
3.35.	Muddee imisa bilood ah ayaa caanaha naaska keliya siinaysay?	_____ Bilood M= Ma-garanayo /ma-hubo
3.36.	Toddobaadkii illaa imisa jeer ayaa toddobaadkii loo-qubeeyaa	A= maalin-weliba B= Laba-jeer C=Maalin-dhaaf D= Toddobaadkii N=Tiro kale /Sheeg
3.37	Ilmahaagu markuu xanuunsado, xaggeed gaysaa?	A= Sida qaalibka ah waxaa lagu daweeyaa guriga dhexdiisa B=Waxaa loo-geeyaa dhakhaatiir dhaqameedka C= Waxaa la-geeyaa xarun caafimaad N =Meelo kale (Sheeg) _____
3.38.	Weligaa ilmahaagaa miyaad geysay xarun caafimaad?	A =Haa B = Maya
3.39	Ilmo dhintay muujira sadexdii bilodeedanbe	A = Haa B = Maya
3.40	Haddi ay jirto sabab	

PART 4: CABBIRADA JIDHKA

	Da’da	Jinsiga (mid goobaab)	Natiijada	Faallo

4.1.	Miisaanka ilmaha oo kilogram lagu cabbiray (Kg)		L / Dh		
4.2.	Dhararka ilmaha (cm)				

QAYBTA 5: CABBIRKA "HEMOGLOBIN" (HEERKA) IYO MIDABKA MAQAARKA

5.1 CABBIRKA "HEMOGLOBIN" (HEERKA)

		Da'da	Jinsi (mid goobaab)	Natiijo	Faallo
5.1.1	Heerka "hemoglobin" inta giraam ee halka litir ku-dhex-jira (g/l)		L / Dh		

5.2 BAADHITAANA MIDABKA MAQAARKA IYO CIDIYAHA

Goobta la-baadhayo iyo jiritaanka caddaanta maqaarka		Da'da	Jinsiga (mid goobaan)	Natiijada. Ku-calaamade "X"	Faallo
5.2.1	Gudaha baalasha indhaha		M / F		
5.2.2.	Salka ciddiyaha				
5.2.3	Baabacooyinka				
5.2.4.	Wajiga				
5.2.5	Maqaarka				

QAYBTA 6: QOYSASKA/XANNAANEEYAHA DABEECADAHA

6.1.	Qoysaska/xannaaneeyaha da'da oo sanooyinka lagu cabbiray	_____Sano
6.2.	Markii aad ilmihaagii curudaka dhashay, imisa jirbaad ahayd	_____ Sano
6.3.	Tirada guud ee carruurta aad dhashay waa imisa?	_______ tiradooda
6.4.	Miisaanka jidhka markaad uurka lahayd	______ kg M= Ma-garanayo /ma-hubo
6.5.	Siday ahayd xaaladda caafimaad markii aad uurka lahayd	A= Way fiicnayd B= Ma-fiicnayn /waan xanuunsanayey
6.6.	Markaad uurka lahayd miyaad heli jirtay xannaanada hooyooyinka uurka leh (ANC)?	A Haa B=Maya
6.7.	Markaad imisa bilood uur lahayd ayaad tagtay goobta	Markaan ______ bilood uur lahaa

	xannaanada hooyooyinka uurka leh (ANC)?	M. Ma-garanayo /ma hubo
6.8.	Markaad uurka lahayd imisa jeerbaad tagtay goobta xannaanada hooyooyinka uurka leh?	_______ jeer
6.9.	Miyaad garanaysaa qorshaynta qoyska	A=Haa B= Maya
6.10.	Weligaa miyaad isticmaashay hababka qorshaynta qoyska?	A=. Haa B= Maya
6.11.	Sida qaalibka imisa jeerbaad gacmaha maydhataa? (waxaa la-bixin karaa in ka-badan hal jawaab)	A= cuntada ka-hor iyo kaddib B=.Ka-hor intaanan cuntada qaybin C= Markaan saxaroodu kaddib D= Markaan suuliga isticmaalo kaddib N= Marar kale (sheeg) _______________
6.12.	Sideed gacmaha u maydhataa?	A= Biyo keliya ayaan isticmaalaa B= Waxaan marmar isticmaalaa saabbuun C= Waxaan marwelba isticmaalaa saabbuun 4. Waxaan isticmaalaa dambas /ciidda

PART 7: CAAFIMAADKA DEEGAANKA

7.1.	Waxaa maxay isha ugu weyn ee aad biyaha ka-heshaanr? Mid goobaab	A= Biyaha qasabadda B= Ceel dhawrsoon C= Ceel aan dhawrsoonayn D= Wabi, har, biya xidhan E= Il biyo oo dhawrsoon F= Il biyo oo aan dhawrsoon G=Xareedda N= Kuwa kale, sheeg ______
7.2.	Muddo intee dhan ayey kugu qaadataa soo dhaaminta biyuhu (wakhitiga ay biyo soo-dhaamintu qaadato)? Mid goobaab	A = < 15 daqiiqo B = 15 – 30 daqiiqo C = 30 daqiiqo – 1 saacadood D = > 1 saac
7.3.	Waa intee caddadka biyaha ee uu qoysku malinwelba u baahanyahay?	A= < 20 Lt B =2 0 - 40 Lt C= > 40 Lt M=Ma-garanayo
7.4.	Miyaad isticmaashaan farsamooyinka biyaha lagu nadiifiyo ee biyaha ammaan lagaga dhigo?	A=Haa B= Maya
7.5.	Miyaad leedihiin weelal biyaha lagu kaydsado?	A= Haa B= Maya

7.6.	Haddii ay jawaabto "haa" tahay, maxay yihiin weelasha aad biyaha ku-shubataan?	A= Jarikaano caagag ah B= Jarikaano C= jalxad dhoobo ah D= Roto N. Kuwa kale, sheeg: ________
7.7.	Miyaad leedihiin suuli?	A=Haa B= Maya
7.8.	Haddii ay jawaabtu "haa" tahay, suuligiinu waa mid nooce ah?	A= God dhaqameed B = God casri ah oo la horumariyay oo ay hawdo si xor ah u soo geli karto C = Suuliga biyaha lagu siidaayo N= Kuwa kale, Sheeg ______________
7.9	Haddii ay jawaabtu "maya" tahay, xaggeed ku-saxarootaan?	A = Bannaanka B= Hawdka N= Meel kale, sheeg ___
7.10.	Xaggeed gashaan (gabboodka)?	A = Teendho B= Bac /shary kale C= Mudul/Meel dhisan D = Meel ma-haysano N= Meel kale______
7.11.	Sida iskaga xoortaan xashiiska adkaha ah (solid waste)?	A= Waanu aasnaa B= Meel bannaan ayaanu ku-qubnaa C= Waanu gubnaa D= Waxaanu ku xoornaa godka qashin qubka ee bulshada

AADBAAD U MAHADSANTAHAY

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11.መጠይቅ

ክፍል 1. የማሕበራዊ ዲሞግራፍያዊ ሁኔታ		
ተ.ቁ	**ጥያቄ**	**መልስ**
1.1.	የቤቱ ሀላፊ	ሀ= ወንድ ለ= ሴት
1.2.	ከምኘ መኖር ከጀመሩ ስንትጊዜ ይሆኖታል	____ቀን_____ወር____እ.እ.አ
1.3.	ዕድሜያቸው ስንት ነው	____ቀን_____ወር____እ.እ.አ
1.4.	ሀይማኖትዎ	
1.5.	ብሄርዎ	

1.6.	የጋብቻ ሁኔታዎ	ሀ=ያገባ /ች ለ=የፈታ/ች ሐ= የሞተበት/ባት መ =ጋብቻው ፈርሶ በህግ ግን ያልተለያዩ
1.7.	በቤት ውስጥ የሚኖሩአጠቃላይ የሰው ብዛት	
1.8.	ከአምስት አመት በታች የሆኑ የህፃናት ብዛት	
1.9.	የእናት የትምህርት ደረጃ፡ መሠረታዊ /መደበኛ /ትምህርት ተምረዋል?	ሀ = አዎ ለ = አልተማርኩም (አልተማርኩም ከሆነ ወደ ቁጥር 1.11 ይለፉ)
1.10.	መሠረታዊ ትምህርት ተምረው ከሆነ የትምህርት ደረጃዎ?	**ሀ= 1-4 ለ= 5-8 ሐ= 9-12** መ= ቮኬሽናል ሰርተፊኬት ሠ= ዲኘሎማ ረ=ዲግሪ ከ= ሌላ ይገለፅ ____
1.11.	መደበኛ ያልሆነ ትምህርትስ አግኝተዋል?	ሀ = አዎ ለ = አላገኘሁም (አላገኘሁም ከሆነ ወደ ቁጥር 1.13 ይለፉ)
1.12.	ማንበብ እና መፃፍ ይችላሉ?	ሀ= አዎ ለ=አልችልም
1.13	የቤተሰብ የትምህርት ሁኔታ፡ ባለቤትዎ መደበኛ ትምህርት ተምረዋል?	ሀ = አዎ ለ = አልተማሩም (አልተማሩም ከሆነ ወደ ቁጥር 1.15 ይለፉ)
1.14	መሠረታዊ ትምህርት ተምረው ከሆነ የትምህርት ደረጃዎ?	ሀ= 1-4 ለ= 5-8 ሐ= 9-12 መ= ቮኬሽናል ሰርተፊኬት ሠ= ዲኘሎማ ረ= ዲግሪ ከ = ሌላ ይገለፅ ____
1.15	መደበኛ ያልሆነ ትምህርትስ ተምሯል?	ሀ = አዎ ለ = አልተማርኩም (አልተማርኩም ከሆነ ወደ ቁጥር 17 ይለፉ)
1.16	ማንበብና መፃፍ ይችላሉ?	ሀ = አዎ ለ = አይችሉም
1.17	ስራዎ/ለእናት/	ሀ = ነጋዴ ለ = የቀን ሰራተኛ ሐ = መንግስታዊ ባልሆነ ድርጅት ተቀጣሪ /ሰራተኛ/ መ = የቤት እመቤት ሠ = የለኝም ከ= ሌላ ይገለፅ ____
1.18	ባለቤትዎ ስራ?	ሀ =ነጋዴ ለ = የቀን ሰራተኛ ሐ = መንግስታዊ ባልሆነ ድርጅት ተቀጣሪ /ሰራተኛ/ መ = ስራ የላቸውም ከ= ሌላ ይገለፅ ____

1.19	አጠቃላይ የወር ገቢያቸው (በአሜሪክን ዶላር) ስንት ነው?	
1.20	ያገኛችሁትን ገንዘብ ለመጠቀም ማን ያዛል/(ይወስናል)?	ሀ = በዋናነት ሚስት ለ =በዋናነት ባል ሐ= ባል ብቻ መ= ሁለታችን በጋራ
1.21	ውሳኔ የመስጠትና የመቆጣጠር ስልጣን/መብት/አለዎት?	ሀ = አዎ ለ = የለኝም ሸ = አላውቅም /እርግጠኛ አይደለሁም
1.22	ራሽን የሚያገኙ የቤተሰብ ቁጥር	____
1.23	ልጆች ራሽን ያገኛሉ?	ሀ = አዎ ለ = አያገኙም

ክፍል 2.የምግብ መረጃ

2.1. በዚህ አመት አብዛኛው የምትመገቡት ዋና ምግብ ምን ዓይነት እህል ነው?(የ X ምልክት ያድርጉ)

ስንዴ	ሩዝ	ኦቾሎኒ/ለውዝ/	በቆሎ	ማሽላ	ከሳቫ	ሌላ

2.2. ምግባችሁ ከምን ዓይነት እህል ነበር ላለፉት 4 ሳምንታት የሚዘጋጀው? የ X ምልክት ያድርጉ/

ስንዴ	ሩዝ	ኦቾሎኒ/ለውዝ/	በቆሎ	ማሽላ	ከሳቫ	ሌላ

2.3. በዚህ አመት አብዛኛው ምግባችሁ የምታገኙት ከየት ነው? (የ X ምልክት ያድርጉ)

ራሳችን ከመረትነው	በመበደር	በመግዛት	በእቃ በመለወጥ	በነፃ ከሚሰጠን ምግብ

2.4. ላለፉት 4 ሳምንታት የምግባችሁ ዋና ምንጭ ከማን ነው? (የ X ምልክት ያድርጉ)

ራሳችን ከመረትነው	በመበደር	በመግዛት	በእቃ በመለወጥ	በነፃ ከሚሰጠን ምግብ

2.5. ለሚመጡ ሦስት ወራት ምግባችሁን የምታገኙት (የሚመጣው) ከማን ነው? (የ X ምልክት ያድርጉ)

ራሳችን ከመረትነው	በመበደር	በመግዛት	በእቃ በመለወጥ	በነፃ ከሚሰጠን ምግብ

2.6.	ላለፉት 6 ወራት ራሽን አግኝታችኋል/			ሀ = አዎ ለ = አላገኘንም (አላገኘንም ከሆነ ወደ 2.16 ቁጥር ይሂዱ) ሸ= አላው	
2.7.	ራሽን ለማግኘት ምን ያህል ጊዜ ይወስዳል?			------------ ሰዓት	
2.8.	የተሰጣችሁ የምግብ ራሽን ምን ያህል ጊዜ ይቆያል?			------------ ቀናት	
2.9.	በየትኛው ወር ነው አጠቃላይ ራሽን ያገኛችሁት? የ X ምልክት ያድርጉ/				
	ጥቅምት	ህዳር	ታህሳስ	ጥር	የከቲት	መጋቢት
2.10.	ባለፈው ራሽን ሲሰጣችሁ ከሚከተሉት የምግብ አይነቶች ምን ያህል ተሰጣችሁ?				
	_______ Kg ስንዴ ______Kg ሩዝ ________ Kg በቆሎ_______ Kg ማሽላ ________Lt ዘይት _______ ጨው ______ አተር ________ ባቄላ _______ ሌላ ይገለፅ				
2.11.	የሚሰጣችሁ ራሽን በቤት ውስጥ ባሉ ሰዎች ነው የሚበላው			ሀ= አዎ (14) ለ = አይደለም ሸ = አላውቅም/አይታወቅም	
2.12.	የሚሠጣችሁ ራሽን ከሌሎች ቤተሰቦች ወይም ከጎረቤታችሁ ጋር ነው አብራችሁ የምትጠቀሙት?			ሀ= አዎ ለ = አይደለም ሸ = አላውቅም/አይታወቅም	
2.13	ከሚሰጣችሁ የምግብ ራሽን የተወሰነ ትሸጣላችሁ?			ሀ=አዎ ለ = አንሸጥም ሸ = አላውቅም/አይታወቅም/	
2.14.	በቤት ውስጥ ምግብ ታዘጋጃላችሁ?			ሀ=አዎ ለ = አናዘጋጅም (አናዘጋጅም ከሆነ ወደ ቁጥር 2.15 ይለፉ) ሸ = አይታወቅም/ከሆነ ወደ ቁጥር 2.16	
2.15.	አናዘጋጅም ከሆነ ለምን? የX ምልክት ያድርጉ				
	ምግብ የለም	መጥበሻ የለም	እንጨት /ጋዝ የለም	ሌላ	
2.16.	የቤት እንስሳ አላችሁ?			ሀ= አዎ ለ =የለንም (የለም ከሆነ ወደ ክፍል 3 ይለፉ)	

2.17	አዎ አለን ከሆነ በቁጥር ይፃፉ					
	ፍየል	በግ	የጋማ ከብት	ላም/በሬ	ግመል	ሌላ

	ክፍል 3.የልጅ ሁኔታ:አያያዝና እንክብከቤ በተመለከተ	
3.1	ከምኘ መኖር ከጀመ ስንት ጊዜ ሆኖታል	____ ቀን ____ወር ____እ.እ.አ
3.2	ዕድሜው	____ ቀን ____ ወር ____ እ.እ.አ
3.3	ፆታ (አንዱን ያክብቡ)	ወ / ሴ
3.4	የት ነው የተወለደው /አንዱን ያክብቡ/	ሀ= በቤት ለ= በጤና ተቋም ከ= በሌላ ይጠቀስ ____
3.5	ሲወለድ የነበረው ክብደት	____ ኪ.ግ
3.6	አሁን የተመዘገበው በየትኛው የምግብ ኘሮግራም ነው	ሀ= SFP(ተጨማሪ የምግብኘሮግራም) (3.9) ለ= TFP (የምግብ ኘሮግራም) (3.9) = (3.7) ሸ= አላውቅም
3.7	ልጅዎ በምግብ ኘሮግራም (መመገብያ ማዕከል) ተከታትሎ ያውቃል?	ሀ =አዎ ለ= አያውቅም
3.8	ከሆነ ለምን ያህል ጊዜ ተከታትሏል?	____ቀናት
3.9	ምን ችግር ወይም ጥሩ ነገር ታዝበዋል ልጅዎ በመመገብያ ማዕከል ኘሮግራ ሲከታተል	
3.10	ልጅዎ ክትባት ተከትቦ ያውቃል?	ሀ=አዎ ለ= አያውቅም (3.12)
3.11	ልጅዎ የወሰደ የክትባት አይነት/ከርድ ይመልከቱ:: ከርድ ከሌለ ቤተሰብ ይጠይቁ እንዲያስታውሱት /ከአንድ በላይ መመለስ ይቻላል	ሀ=የሳንባ ነቀርሳ (ቢ.ሲ.ጂ) ለ= የዘጊ አናዳ፤ትክትክና መንጋጋ ቆልፍ (ዲ.ፒ.ቲ) ሐ= ኩፍኝ መ= የልጅነት ልምሻ
3.12	ልጅዎ ቪታሚን ኤ ወስዷል?	ሀ= አዎ (አዎ ከሆነ___ ቀን___ ወር ____ እ.እ.አ) ለ =አልወሰደም ሸ =አላውቅም/እርግጠኛ አይደለም
3.13	የልጅዎ ተደጋጋሚ በሽታ ወይም የህመም ዓይነት	____ በሽታ ሸ= አላውቅም
3.14	ባለፉት ሁለት ሳምንታት/15 ቀናት/ ውስጥ ልጅዎ ተቅማጥ ይዞት ነበር?	ሀ= አዎ ለ =አልያዘውም ሸ= አይታወቅም
3.15	አዎ ከሆነ በዓመት ምን ያህል ጊዜ	____ ጊዜ
3.16	በተቅማጡ ላይ ደም ነበረው?	ሀ= አዎ ለ= የለውም ሸ= አላውቅም (እርግጠኛ አየደለሁም)

3.17	ባለፉት ሁለት ሳምንታት(15 ቀናት) ውስጥ ልጅዎ ትኩሳት ወይም የመተንፈስ ችግር ነበረው?	ሀ=አዎ ለ= አልነበረውም ሽ= አላውቅም (እርግጠኛ አየደለሁም)
3.18	ባለፉት ሁለት ሳምንታት(15 ቀናት) ውስጥ ልጅዎ በወባ ታሞ ነበር?	ሀ= አዎ ለ= አልታመመም ሽ= አላውቅም (እርግጠኛ አየደለሁም)
3.19	ባለፉት 6 ወራት ውስጥ ልጅዎ በኩፍኝ ታሞ ነበር?	ሀ= አዎ ለ=አልታመመም ሽ= አላውቅም (እርግጠኛ አየደለሁም)
3.20	ልጁ በሁለት እግሩ ላይ እብጠት አለበት (Oedema) ቼክ ያድርጉ	ሀ=አዎ ለ=የለውም
3.21	የልጁ የስጋ እናት በህይወት አሉ?	ሀ=አዎ ለ=የሉም
3.22	ልጅዎ እየጠባ ነው?	ሀ =አዎ ለ= አይደለም (3.24)
3.23	ልጅዎ ምን ያህል ጊዜ ይጠባል?	____ ጊዜ በ24 ሰዓት ____ ጊዜ በቀን ____ ጊዜ በሌሊት
3.24	አጥብተው ያውቃሉ (ልጅዎትን አጥብተው ያውቃሉ?	ሀ =አዎ ለ= አላውቅም (አዎ ከሆነ ወደ ቁጥር 3.26 ይለፉ)
3.25	አላውቅም ከሆነ ለምን? ምክንያቱን ይፃፉ	
3.26	ከወሊድ በኃላ ማጥባት የተጀመረበት ጊዜ	ሀ= እንደተወለደ ወድያውኑ ለ =____ ሰዓት /ከ24 ሰዓት በታች ከሆነ ሐ= ___ቀናት ሽ= አላውቅም/ አርግጠኛ አይደለሁም
3.27	ከማጥባትዎ በፊት ለልጅዎ ምግብ ይሰጣሉ?	ሀ= አዎ ለ=አልሰጥም
3.28	የሚሰጡ ከሆነ ምንድነው የሚሠጡት?	ሀ= ውሃ ለ= ቅቤ ሐ= የላምወተት መ=የዱቄት ወተት ሠ= የስኳር ተዋጽኦ ረ= ሻይ ከ= ሌላ ይገለፅ ____
3.29	እስከሁን እያጠቡ ነው?	ሀ= አዎ ለ= አይደለም
3.30	ለልጅዎ ተጨማሪ ምግብ (ከጡት ወተት በተጨማሪ) ይሰጣሉ?	ሀ=አዎ ለ=አልሰጥም
3.31	አዎ ከሆነ ምን አይነት ምግብ	ሀ= የላምወተት ለ=የዱቄት ወተት ሐ= የስኳር ተዋጽኦ መ ሻይ ረ= ዳቦ ከ=ሌላ ይገለፅ ____

3.32	በቀን ስምን ያህል ጊዜ/በ24 ሰዓት ስምን ያህል ጊዜ?	____ ጊዜ
3.33	በስንተኛው ወር ወይም ዓመት ነው ልጅዎ ተጨማሪ ምግብ የጀመረው?	____ ወር ወይም ____ አመት
3.34	ስምን ያህል ወር ነው ልጆትን ያጠቡት?	____ ወር
3.35	ስምን ያህል ወር የጡት ወተት ብቻ አጥብተዋል?	____ ወር ሸ= አላውቅም/እርግጠኛ አይደለሁም
3.36	ልጅዎ በሳምንት ምን ያህል ጊዜ ገላውን ይታጠባል?	ሀ= በየቀኑ ለ= ሁለት ጊዜ ሐ= በየሁለት ቀን ከ= ሌላ ይጠቀስ
3.37	ልጅዎ ሲታመም ወዴት ይወስዱታል?	ሀ= እቤት ውስጥ ይታከማል ለ=ወደ ባህል ሕክምና አዋቂ ጋር ሐ= ወደ ጤና ድርጅት ከ =ሌላ ይጠቀስ ____
3.38	ልጅዎትን ወደ ጤና ድርጅት ወስደውት ያውቃሉ?	ሀ =አዎ ሸ = አላውቅም
3.39	3 ?	= =
3.40		

ክፍል 4: አንትሮፖሜትሪክ ሜጀርመንት

		ዕድሜ	ፆታ	ውጤት	ማስታወሻ
4.1	የልጁ ክብደት ኪ .ግ (Kg)				
4.2	የልጁ ቁመት በሴንቲ ሜትር(cm)				

ክፍል 5: የደም ማነስ/አነሞያ/ መጠን

5.1	ሄሞግሎቢን መጠን	ዕድሜ	ፆታ	ውጤት	ማስታወሻ
5.1.1	የልጁ የHb መጠን በ g/l				
5.2	(pallor)				
		ውጤት(የ X ምልክት ያድርጉ)			ማስታወሻ
5.2.1.	- (Conjunctivae)				
5.2.2.	(Nail beds)				
5.2.3.	(Palms)				
5.2.4.	(Face)				
5.2.5.	(skin)				

ክፍል 6፡ የቤተሰብ ሁኔታ		
6.1	ዕድሜዎ ስንት ነው	____ ዓመት
6.2	በመጀመርያ ሲወልዱ የነበራቸው ዕድሜ	____ዓመት
6.3	ምን ያህል ልጆች ወልደዋል	____ በቁጥር
6.4	በእርግዝና ወቅት የነበሮት ክብደት I	____ ኪ.ግ ሸ = አላውቀውም(እርግጠኛ አይደለሁም)
6.5	በእርግዝና ወቅት የነበርዎት የጤና ሁኔታ	ሀ= ጥሩ ለ= ጥሩ አልነበረም(/እታመም ነበር)
6.6	ለቅድመ ውልጃ የሕክመና አገለግሎት (ANC) ወደ ጤና ድርጅት ሄደው ያውቃሉ?	ሀ=አዎ ለ=አላውቅም
6.7	በስንተኛው የእርግዝና ወር ነው የቅድመ ውልጃ የሕክመና ክትትል (ANC) የጀመሩት	____ ወር ሸ = አላውቀውም(አርግጠኛ አየደለሁም)
6.8	በእርግዝና ወቅት ለምን ያህለ ጊዜ የቅድመ ውልጆ አገልግሎት (ANC) አግኝተዋል(ተከታትለዋል)?	____ ጊዜ
6.9	ስለ ቤተሰብ ምጣኔ አገልግሎት ያውቃሉ ?	ሀ=አዎ ለ= አላውቅም
6.10	የቤተሰብ ምጣኔ አገልግሎት(የእርግዝና መከላከያ ዘዴ)ተጠቅመው ያውቃሉ?	ሀ= አዎ ለ= አላውቅም
6.11	መቼ ነው በብዛት እጃቸውን የሚታጠቡት(ከአንድ በላይ መመለስ ይቻላል)	ሀ = ምግብ ከማዘጋጀት በፊት እና በኀላ ለ= ምግብ ከመብላት በፊት ሐ= ልጄን ከፀዳዳሁኝ በኂላ መ =ከሽንት ቤት መልስ (ሽንት ቤት ከተጠቀምኩኝ በኀላ) ከ= ሌላ ይጠቀስ
6.12	እጅዎ የሚታጠቡት በምንድን ነው?	ሀ= በውሃ ብቻ ለ=አንዳንዴ ሳሙና በመጠቀም

		ሐ= ሁሌ በሳሙና በመጠቀም መ= አንዳንዴ አፈር(አመድ) በመጠቀም
	ክፍል 7:- የአከባቢ ጤና አጠባበቅ ሁኔታ	
7.1	የውሃ ምንጫችሁ ምንድን ነው(የውሃ አገልግሎት በተመለከተ)	ሀ= የቧንቧ ለ=የጉድገኋድ የተጠበቀ ሐ=የጉድጓድ ያልተጠበቀ መ= ከወንዝ፤ ሐይቅ፤ግድብ ረ=የምንጭ የተጠበቀ ሠ= የምንጭ ያልተጠበቀ = የዝናብ ውሃ ከ=ሌላ ይጠቀስ ____
7.2	ውሃ ለማምጣት ለደርሶ መልስ የሚወስደው ሰዓት(በግምት)	ሀ= ከ15 ደቂቃ በታች ለ = ከ15-30 ደቂቃ ሐ= ከ30 ደቂቃ - 1 ሰዓት መ = ከ 1 ሰዓት በላይ
7.3	የውሃ ፍጆታ መጠን(ለመጠጥ፤ ለአጠባ ወዘተ በግለሰብ ደረጃ በሊትር አማከይ ግምት	ሀ=ከ20 ሊትር በታች ለ= ከ20-40 ሊትር ሐ=ከ40 ሊትር በላይ ሀ=አላውቀውም
7.4	ውሃው ከጀር ነፃ ለማድረግ ውሃው ያክሙታል (Water treatment)?	ሀ= አዎ ለ=
7.5	በቤት ውስጥ የውሃ ማስቀመጫ አለ?	ሀ= አዎ ለ= የለም (የለም ከሆነ መልሱ ወደ ተራቁጥር 7.7 ይለፉ)
7.6	አዎ ከሆነ በቤት ውስጥ የመጠጥ ውሃ በምን ውስጥ ይቀመጣል?	ሀ=በኘላስቲክ(በባለዲ) ለ= በጀሪከን ሐ= በእንስራ መ= በሮቶ ከ= ሌላ ይጠቀስ ____
7.7	መፀዳጃ ቤት አለ	ሀ =አዎ ለ= የለም
7.8	ከለ ዓይነቱ ይገለፅ	ሀ= ባህላዊ ጉድጓድ (Traditional pitlatrive) ለ=VIP (ዘመናዋ መፀዳጃቤት) ከ=ሌላ ይገለፅ
7.9	መፀዳጃ ቤት ከሌለ የት ይጠቀማሉ	____
7.10	ቤታቸው ከምን የተሠራ ነው(ምን ዓይነት ቤት አላችሁ)?	ሀ=ድንኳን ለ=ከኘላስቲክ የተሠራ/በሌላ የተሸፈነ ሐ=ጎጆ /የሳር /ቤት መ= ምንም የለንም ከ= ሌላ ከለ የጠቀስ
7.11	የግቢ ደረቅ ቆሻሻ አንዴት ያስወግዳሉ?	ሀ=በተቆፈረ ጉድጓድ በመቅበር ለ= ሜዳ ላይ ሐ= በማቃጠል መ= በጋራ በተቆፈረ ጉድጓድ

DECLARATION

I the undersigned, declare that this thesis is my original work, has never been presented in this or any other university, and that all the resources and materials used for the thesis development, have been quoted and acknowledged as complete references.

Name: Yasin Jemal

Signature: __________

Date of submission: ______________

Place: Addis Ababa, Ethiopia

This thesis work has been submitted for examination with my approval as university primary advisor.

Name: Dr. Jemal Haidar

Signature: __________________

Date: ______________________