Report of Baseline Urban Nutrition Assessment in the Slums of Nairobi East and North Districts, Nairobi Kenya

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Executive Summary

A baseline assessment of key health and nutrition indicators was conducted in the slum and informal settlements of Nairobi East and Nairobi North Districts. The assessment was stratified by health center catchment areas and individual cluster samples were taken within each health center catchment. Parallel samples of women with children under five, children 0 to 5 completed months, children 6 to 59 and children 6 to 23 months were taken to evaluate indicators applying to these different groups.

Acute malnutrition rates among children 6 to 59 months were quite low throughout the sampled area with GAM at 1.8% and SAM at 0.06%. When the very high populations of the slums are considered however, these low prevalences still translated into several hundred children requiring treatment for severe acute malnutrition. Furthermore applying the new WHO based growth standards to the sample causes GAM and SAM prevalence to increase dramatically to 3.5% and 0.3% respectively. Including the new WHO recommended MUAC cut-off of 11.5 cm to define severe acute malnutrition SAM prevalence jumps even further to 1.9%. Current coverage of OTP services for severely malnourished children was 37.7% below the SPHERE target of 70% for an urban area.

Indicators of young child feeding were generally encouraging. Over 40% of children under 6 months had been exclusively breastfeed on the preceding day and most children 6 to 23 months where receiving the minimum number for meals for their age. Diet quality however was lacking, with only 38.6% of children receiving 4 or more food groups on the day before the survey. This low dietary diversity among children mirrored what was seen at the household level, particularly with regard to low intake of animal source foods. This suggests that one of the primary determinates of children dietary diversity is food availability at the household level. Increasing household's access to animal source foods should therefore be a priority to increase children's intake of this key food group.

Coverage of antenatal care was very high with 98.5% of respondent mothers attending ANC at least once during their pregnancy. Coverage of 4 or more ANC visits was much lower however at 53%. Iron/folate supplementation coverage was also low with just over 50% of women taking any iron/folate and most of these took the supplements for less that 20 days indicating poor compliance.

While 75% of mothers had heard of Malezi Boraby name or were generally aware of a child and maternal health campaign, only 37% who were aware of it had attended the last campaign. The primary reasons for non-attendance were lack of information about the campaign and maternal time constrains. Despite poor attendance at Malezi Bora, child immunization coverage was generally high (above 90% for the early childhood vaccinations BCG, at least one dose of OPV and DPT, and above 80% for measles), indicating that most children are getting vaccinated through routine health services.

Based on this baseline assessment, priority areas for the programme moving forward are to increase availability and coverage of OTP services through MoH and other partners, with particular emphasis on increasing community awareness of severe acute malnutrition and the existence of OTP services for these children. Another key area where coverage should be improved is Malezi Bora attendance. While routine vaccination coverage is high, maternal nutrition knowledge, another key focus of Malezi

Bora, was low with most mothers unable to name any Vitamin A rich food sources or fortified foods.

The factors limiting household level dietary diversity should also be explored to identify potential interventions to increase intakes of key nutrient rich food groups. Improving household level consumption of these foods will likely improve child intakes as household availability and child intake appear to be closely linked.

List of Acronyms

ANC	Antenatal Care
ARI	Acute respiratory infection
CBO	Community based organization
CHW	Community health worker
DHS	Demographic and Health survey
DPT	Diptheria-pertussis-tetanus
EA	Enumeration area
EBF	Exclusive breastfeeding
EPI	Expanded immunization programme
FBO	Faith based organization
FGD	Focus group discussion
GAM	Global acute malnutrition
HC	Health Centre
HCC	Health centre catchment
HDDS	Household dietary diversity score
HIV	Human immunodeficiency virus
IDDS	Individual dietary diversity score
IMAM	Integrated management of acute malnutrition
KCBS	Kenya Central Bureau of statistics
MoH	Ministry of Health
MUAC	Mid-upper arm circumference
NCHS	National center for health statistics
OPV	Oral polio vaccine
OTP	Out-patient Therapeutic Program
PEV	Post-election violence
SAM	Severe acute malnutrition
TB	Tuberculosis
TBA	Traditional Birth Attendant
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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1. Background:

Rapid urbanization is a trend seen across the developing world, with the fastest rates of growth seen in Sub-Saharan Africa.[1] Much of this is due to rural urban migration into slum and informal settlement areas within major urban centres. The urban poor living in these settlements face a unique set of challenges compared to their rural counterparts. Almost exclusively dependent on the market for food and other necessary items, slum dwellers are very vulnerable to price increases and other market shocks. The population density of slums, in combination with poor sanitation and limited access to clean water, also translates into high transmission risk for communicable diseases.[2] Despite their increasing proportion of the overall population little data is available on the communities living in the slums. Although this is changing with new research focusing on slum dwellers the body of knowledge on basic indicators, particularly health and nutrition, is still limited.

Urbanization rates in Kenya have mirrored those seen in other Africa countries and the growth of urban slums has been particularly high. Approximately 45% of the urban population of Kenya resides in Nairobi and 4.9 million of these people live in slums[3]. The post election violence that affected the country in December 2007/January 2008 led to massive population displacement, the destruction of many shops and small businesses in the slums and the loss of some 1,200 lives countrywide. On top of this, Kenya has been experiencing substantial price increases in the cost of basic food items since January 2008, which has lead to increasing adoption of negative coping strategies among slums residents.[4] Nairobi also has some of the highest rates of HIV and TB in the country, co-morbidities that exacerbate the effects of poor dietary intake and are highly associated with acute malnutrition. Given the underlying socioeconomic, environmental and disease transmission conditions in the slums of Nairobi, high coverage of basic preventative and curative health and nutrition services is key to preventing child morbidity and mortality in this population.

1.1 Programme Background:

Concern Worldwide has been active in Kenya since 2002 and currently has programmes in health and nutrition, livelihoods/food security, HIV and primary education. Concern implements these programmes in partnership with local governments and civil society organizations targeting the very poor and vulnerable.[5]

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[1] Kenya Inside Informality: Poverty, Jobs, Housing and Services in Nairobi's slums. 2006. Water and Urban Unit 1 Africa region. Report No. 36347-KE. The World Bank.

[2] WHO. 2009 "Goal 6: Communicable disease prevention and control." http://www.who.int/mdg/goals/goal6/communicable_disease_prevention/en/print.html

[3] Mitullah, W. "Urban slums Reports: The case of Nairobi, Kenya." *Understanding Slums: Case Studies for the Global Report on Human Settlements 2003.* United Nations Centre for Human Settlement. 2003.

[4] Concern Kenya July 2008. Post-election Violence and Rising Food Prices in Selected Nairobi Slums

[5] Concern Kenya. 2008. "Kenya Urban Nutrition Proposal: Technical Assistance to the Kenya Ministry of Health and Partners to improve curative and preventative nutrition services in Nairobi and Kisumu urban slums." Concern Worldwide

A preliminary assessment conducted in 2007 identified 18 slum areas spread over four districts; 3 in Nairobi and one in Nyanza province[6] as targets for intervention. These areas were targeted on the basis of i) being selected by the MoH as part of the 36 initial districts for national roll out of the integrated management of acute malnutrition[7] (IMAM) ii) having been affected by the post election violence iii) high poverty incidence iv) high prevalence of HIV and TB v) poor child health indicators vi) poor coverage of nutrition services and vii) vulnerability to the effect of the increased food and fuel prices. To address poor child health and nutrition in these areas Concern began supporting the Kenya Ministry of Health (MoH), local partners and communities at three levels:

1) providing direct technical support in the implementation of preventative and curative nutrition services;

2) supporting district and national level MoH teams to manage and monitor the nutrition activities; and

3) conducting operational research around service delivery and documenting and disseminating lessons learned/best practices in the integration of nutrition services into existing health systems within Kenya and to a wider external audience. The programme also seeks to link with existing livelihoood programmes in the target areas to improve food access for the programme beneficiaries.[8]

2. Objectives of Baseline Assessment

The baseline assessment described here had 3 main objectives:

1) Determine baseline levels of key health and nutrition indicators
2) Determine coverage of current Outpatient Therapeutic Programme (OTP) services
3) Identify priority areas for future programme activities to address

3. Methodology:

A stratified cluster approach using parallel sampling to capture information on multiple groups at the same time was used to conduct this baseline.

3.1 Survey Area:

While Concern is operational in all three districts of Nairobi, for this assessment the sampling was restricted to Nairobi North and Nairobi East districts. This was done for 2 main reasons; firstly, these two districts contain the majority of health centres

[6] Mutunga, M, 2007. Health Situation Analysis and Health and Nutrition Strategic Direction. Concern Kenya.

[7] Kenya Ministry of Public Health. 2007. "National roll out strategy for integrated management of acute malnutrition (draft)"

[8] Concern Kenya. 2008. "Kenya Urban Nutrition Proposal: Technical Assistance to the Kenya Ministry of Health and Partners to improve curative and preventative nutrition services in Nairobi and Kisumu urban slums." Concern Worldwide

Concern is currently working with or planning to expand support to and secondly, because of the presence of several other agencies in the slums of Nairobi West, much more information is available for these areas on health and nutrition indicators. Within Nairobi North and East sampling focused on the slums areas around target health centres (see below for complete description of sampling frame). A map showing the areas targeted for sampling is presented in Annex 1.

3.2 Sample Size Determination:

The primary objective of this assessment was to determine baseline coverage of several key health services so that progress in improving these coverage rates can be detected at the end of the 5-year project. Estimates of the baseline coverage levels for the primary indicators were based on information from the 2003 Kenyan Demographic and Health Survey (DHS) and other sources. The minimum expected improvement in coverage for each indicator was then identified through consultation with the Concern nutrition team and partners. The baseline prevalence estimate and expected change were then used to calculate the minimum required sample size for each of the indicators (See annex 2 for calculations) Because the sample was clustered, the sample sizes obtained from the standard formulas for a simple random sample were adjusted by a design effect to account for the effects of clustering on the precision of the sample. A design effect of 2 was assumed for all indicators. Based on previous studies looking at similar indicators it was believed that 2 was a conservative estimate of the likely design effect.[9] Finally the sample sizes were increased by 5% to account for the loss of some cases during analysis due to incomplete data and/or other exclusions. For each of the 4 sampling groups identified (see section 3.5 below) the largest necessary sample size for that group was taken as the target sample size.

Deitcher and colleagues recently demonstrated that small cluster sizes of up to 6 individuals per cluster for variables with high intracluster variation such as anthropometric indicators approximate a simple random sample.[10] Six was therefore set as the cluster sample size. To determine the number of clusters per strata the overall sample size was divided by the number of strata (16) and the number of individuals per cluster (6). This value was then rounded up to the next nearest whole number. (Table 1).

The target sample size for children 0 to 5 months was much lower than that of the other groups and following the above procedure yielded a target of 1.09 clusters per strata. Rather than having one cluster where teams sampled 0 to5 months and 2 where they did not, it was decided to reduce the cluster size for this age group and take the same number of clusters per strata as the other age groups to simplify sampling protocols. Therefore 3 children 0 to 5 months were sampled from each of the 3 clusters in a stratum.

[9] Deitchler M, Valdez JJ, Egge K, Fernandez S, Hennigan M: "A field test of three LQAS designs to assess the prevalence of acute malnutrition." *Int J Epidemiol* 2007, **36:**858-864.

[10] See above

Table 1: Target sample sizes for the 4 target groups in the baseline assessment

Target group	Minimum sample size	Number of strata	Cluster per stratum	Individuals per cluster	Final Sample Size
Mother of children <5 years	223	16	223/16/6=2.32~3	6	288
6-59 month olds	257	16	257/16/6=2.68~3	6	288
6-23 month olds	225	16	225/16/6=2.34~3	6	288
0-5 month olds	105	16	105/16/3=2.18~3	3	144

3.3 Stratification:

Strata were defined by health centre catchment areas (HCCs). The geographic area served by each health centre was identified By the Concern nutrition team in consultation with MoH staff and CBO/FBO partners. In Nairobi many of the health centres being supported by Concern are very close together and therefore had overlapping beneficiary populations. For this reason HCCs in Nairobi were defined as a group of health centres, rather than a singular health centre serving a particular area. There is a high level of mobility in the slums and people will often not use the health facility closest to their home, therefore the people living in one slum village may access care at health facilities scattered around the city, from the central hospital to a health centre in another location. For the purposes of the survey however, it was necessary to assign each village to one particular HCC. While this process of defining mutually exclusive catchment areas may not accurately reflect the health seeking patterns of slums dwellers, for the purposes of evaluating health service coverage it remains appropriate because outreach activities and mobilization for campaigns such as Malezi Bora are done by health centres (HC) within their catchment areas and community health workers (CHWs) who are the frontline of the health system are supervised by that HC and are assigned to areas within the health centre's catchment. A list of the 16 HCCs sampled in Nairobi is presented in Annex 3.

3.4 Selection of Primary Sampling Units

Sampling was done separately for each strata (HCC). This allowed for both whole sample point estimates and binary classification of coverage at the individual HCC level. The sampling frame for each stratum was developed based on the 1999 census list of enumeration areas (EAs) developed by the Kenya Central Bureau of Statistics (KCBS). Enumeration areas are sub-village units generally comprising around 100 household structures. EAs were used as the primary sampling unit in Nairobi because the slum villages, many of which had populations exceeding 10,000 people, were too large to be sampled as a whole. Of all the EAs in the sub-locations of a particular HCC, the sampling frame was further restricted to only those EAs that fell in the slums or informal settlements. To determine which EAs were slum EAs and which were settled residential or business areas, maps were obtained from the KCBS which showed the demarcation of the various EAs as well as major landmarks like roads, rivers etc. The nutrition team showed these maps to various key informants including chiefs, sub-chiefs, and CHWs to identify where the slum areas were.

From the sampling frame of EAs for each stratum 3 EAs were then selected using probability proportionate to population size sampling. This gave all potential respondents in a stratum roughly equal chance of being selected for the survey. The population figures used for this process were the 1999 figures extrapolated for population growth over the past 10 years (4.8% annual growth) according to KCBS guidance. While we know that these projections underestimate current slum populations, the relative population sizes would not be affected by this underestimation, assuming population growth has been homogenous across the slums. Because probability proportional to population size depends on the relative population of the units being sampled this should not have biased the sampling process.[11]

3.5 Within Cluster Selection of Households

Within each selected EA samples of 3 to 6 respondents were taken depending on age category (see below). Because a complete list of all HHs in a particular EA was not available, to approximate a simple random sample within the cluster the EPI method was used. The survey team located the centre of the selected EA. The team then spun a pen to indicate a random direction and followed this direction to the edge of the EA, counting all houses within 3 metres of the line as they went. A random number was then chosen between 1 and the total number of houses and this was the first house sampled. Shops and other non-residential buildings were excluded when counting. The next nearest front door was used to select the next house. If a house was closed, the team attempted to determine if an eligible respondent lived there and if so when they would be back. If it was within the sampling day, the team returned to this house. If the mother/child pair was absent for a long period and/or would only return after the team have left the slum, the house was then excluded and the next nearest house with an eligible respondent was taken.

3.6 Parallel Sampling

The primary indicators for this baseline assessment (presented in Annex 4) apply to different groups within the overall target population. For example several of the key indicators refer to coverage of antenatal care (ANC) services while others apply to children between 6 and 59 months, 6 to 23 or 0 to 5 months. The minimum required sample size for each age group was determined as described above. To maximize the efficient use of resources, all four samples were collected simultaneously. Thus survey teams had four sets of questionnaires to complete in each sampled cluster. In each of the selected households, all eligible respondents were sampled.

Complimentary feeding indicators are only applicable to children between 6 and 23 months, this required an over-sampling of this age group as a general sample of children 6 to 59 months would not have enough children below 2 years to reach the

[11] The population displacement that occurred as a result of the post-election violence (PEV) in Nairobi was not homogenous throughout all sampled slums and this may have affected the sampling process, where slums that were heavily populated relative to their neighbors in 1999 have since been depopulated because of post-election violence having a greater probability of selection that a slum that, while smaller at the time of the 1999, was not as affected by PEV and is therefore now the larger slums . This is an important limitation of the assessment. However, as the census is the only source of population data for all the slum areas included in the assessment there was not an alternative sampling frame complete enough to be used for this assessment.

required sample size, but the amount of overlap between the 6 to 23 and 6 to 59 samples varied by cluster. Teams therefore first completed the 6 to 59 month questionnaire for the required 6 children in each cluster. They then completed the 6 to 23 month questionnaire for the remaining number of children 6 to 23 months. This number varied depending on how many of the children included on the 6 to 59 month questionnaire were below 2 years. For example if 3 of the 6 children included in the 6 to 59 sample were also less than 2 years, then the team would complete the 6 to 23 month questionnaire for an additional 3 children to ensure that 6 children under 2 years were sampled from that cluster.

3.7 Resampling

In some of the HCCs sampled it was discovered when teams arrived on the ground that the initial sampling frame contained errors such that some non-slum areas had been included and selected for sampling. Upon consultation with local key informants on the ground the teams corrected and updated the maps. They then selected alternative areas based on this updated information.

3.8 OTP Coverage Assessment

To evaluate the current level of OTP coverage in Nairobi North and East a coverage assessment was nested within the larger survey. Because the only children eligible for OTP services are those with severe acute malnutrition (SAM), and these generally comprise a very small percentage of the overall under five population, relying on a random sample of children 6 to 59 months is inadequate to achieve a sufficient sample of SAM cases. In the HCCs where OTP services are currently being offered therefore, coverage of this service was evaluated using an active and adaptive case finding approach.

The active case finding method uses key informants to identify and screen children who could potentially be severely malnourished. During the training, the survey team members worked together to brainstorm all local terms for malnutrition, a very skinny child, a child with oedema, a sickly child, in the OTP programme, etc. They also developed a list of key informants including CHWs, community leaders, mothers and Traditional Birth Attendants (TBAs) (See annex 5 for list for local terms and key informants).Key informants were asked if they knew of any children in the sampled village/EA that were very thin, had oedema, were very small etc. All children identified by key informants as potential SAM cases were visited and screened. If a child was severely malnourished the child's enrollment status was determined (i.e. was the child currently attending OTP services or not). For SAM children not enrolled in OTP a standard questionnaire was administered to the mother or caretaker to determine the reason(s) the child was not admitted or "uncovered". Finally, the survey team asked the mother of the screened child if she knew any other children who were very thin, had oedema, and/or ate plumpynut. These children were also visited and screened. Only when all identified children had been visited and screened was sampling of that area complete.

Although the initial plan was to conduct all data collection in a cluster on the same day (i.e. complete both the random sampling and the coverage assessment on the same day) time constraints meant that some HCCs had to be revisited on subsequent days

to complete active case finding in the area. While this delay in assessing OTP coverage could potentially have affected the results as children found during the sampling of 6 to 59 month old who were SAM cases would be referred to OTP, thus artificially increasing OTP coverage, this was not the case since only 2 cases of SAM were found in the 6 to 59 sample, both in areas were the OTP coverage assessment was completed on the same day as the 6 to 59 sample.

3.9 Data Entry and Cleaning

All data was entered in EpiData3.1. Four separate databases, one for each sample group were developed along with check files. Data were then exported to excel where they were checked for consistency and accuracy. Any inconsistencies were checked against original data forms and corrected. A random selection of cases was also checked for accuracy of data entry.

3.10 Data Analysis

Data were analyzed using Stata intercooled 9.2. Sample weights were constructed for each observation to account for the complex sample design. Because clusters were selected proportional to population size, observations were self-weighted at the cluster level. Strata level weights were calculated as the sampling fraction for the stratum equivalent to:

W_s= Stratum population size/(Number of clusters sampled in the stratum*Number of individuals sampled in the cluster)

The (svy:) commands in Stata were used to compute proportions and means for the sample adjusted for clustering and weighted according to strata.

4. Results

4.1 Household Characteristics

A total of 288 HH in 48 clusters were sampled. As presented in Table 2 the mean HH size was 4.6. Only 12% of respondent households classified themselves as female–headed. The majority of respondent households relied on casual labour for their main source of income, with petty trading and salary the main income source of 14 and 19% of households respectively. Two percent of respondent households reported having no income source at all while an additional 2 and 0.1% relied on scavenging and remittances respectively to secure income. (Figure 1)

Table 2:Household characteristics

Variable	N	Point estimate	95% CI
Mean HH size	288	4.6	(4.2-5.0)
Mean U5s in HH	288	1.45	(1.36-1.55)
Female HH head	288	11.9	(6.4-17.4)

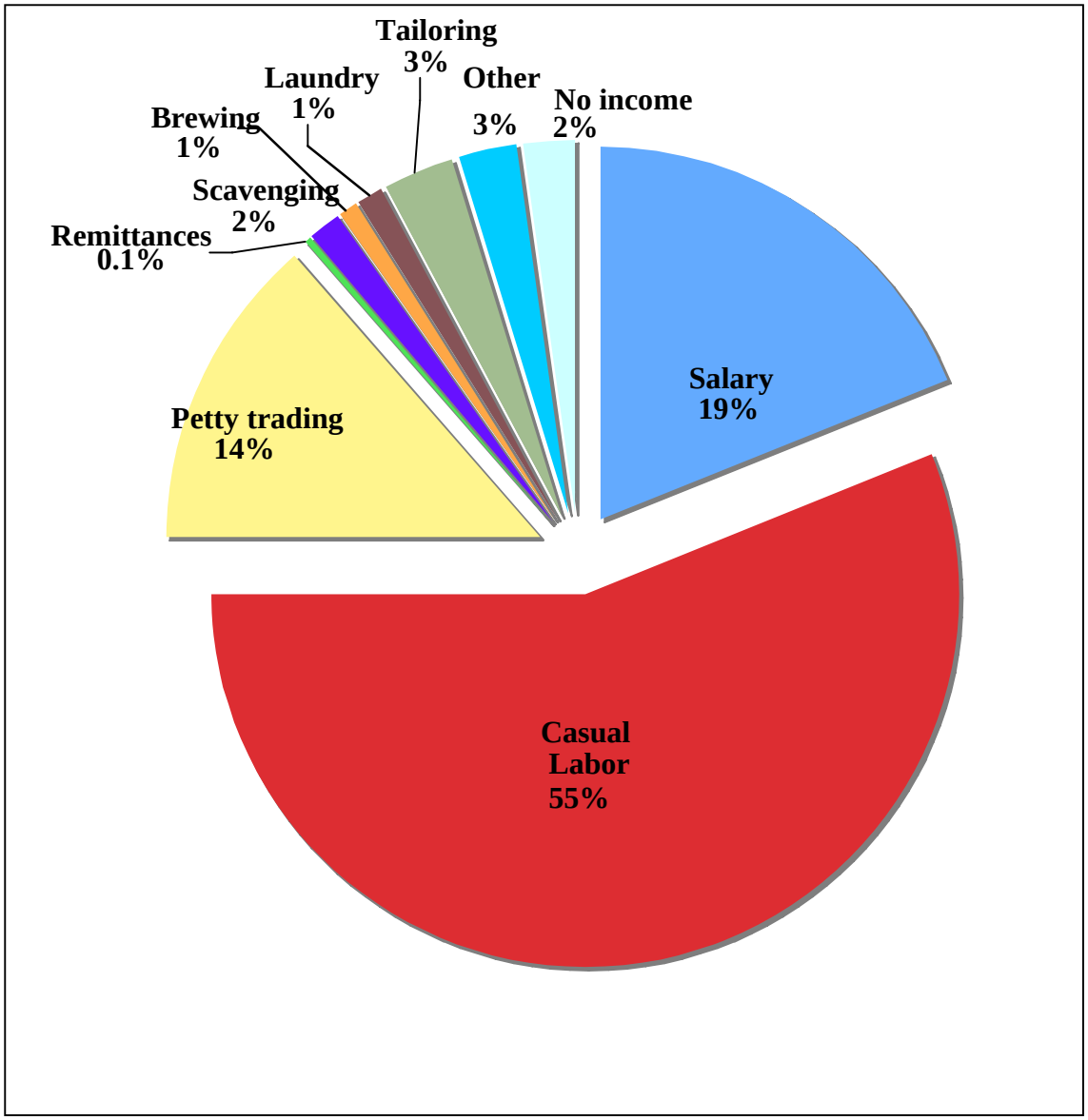

Figure 1: Main source of income for respondent households (n=280)

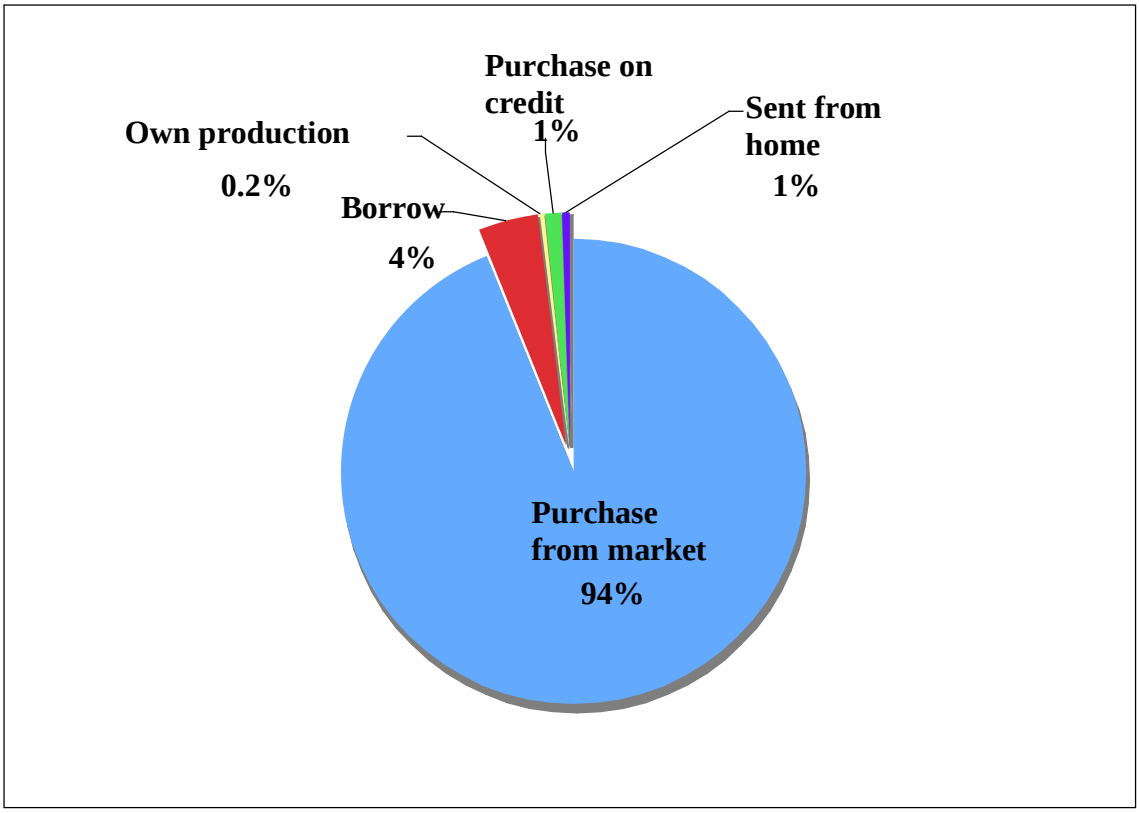

Figure 2:Main source of food at time of year of the survey (March) for respondent households (n=288)

The vast majority of households (94%) purchased their food from the market at this time of year. (Figure 2) Six percent of households relied on borrowing, purchasing on credit or gifts from family to receive food. Only 0.2% of households relied on their own agricultural production to get food. (Figure 2)

4.1.2 Household Dietary Diversity Score (HDDS)

On average households included in this survey ate 2.7 meals per day. This reflects a relative high frequency of food intake. The mean HDDS for the sample was also high compared to results reported from other areas in the country at 6.2. This means that on average survey respondent households were eating 6 out of a possible 12 food groups on the day preceding the survey. (Table 3) When individual food groups are considered however, certain inadequacies in the diet are revealed.

Table 3: Mean number of meals per day and HDDS based on a maximum possible score of 12 different food groups

Variable	N	Point Estimates	95% CI
Mean meals per day for adults	281	2.7	(2.6-2.8)
Mean HDDS score	282	6.2	(5.8-6.5)

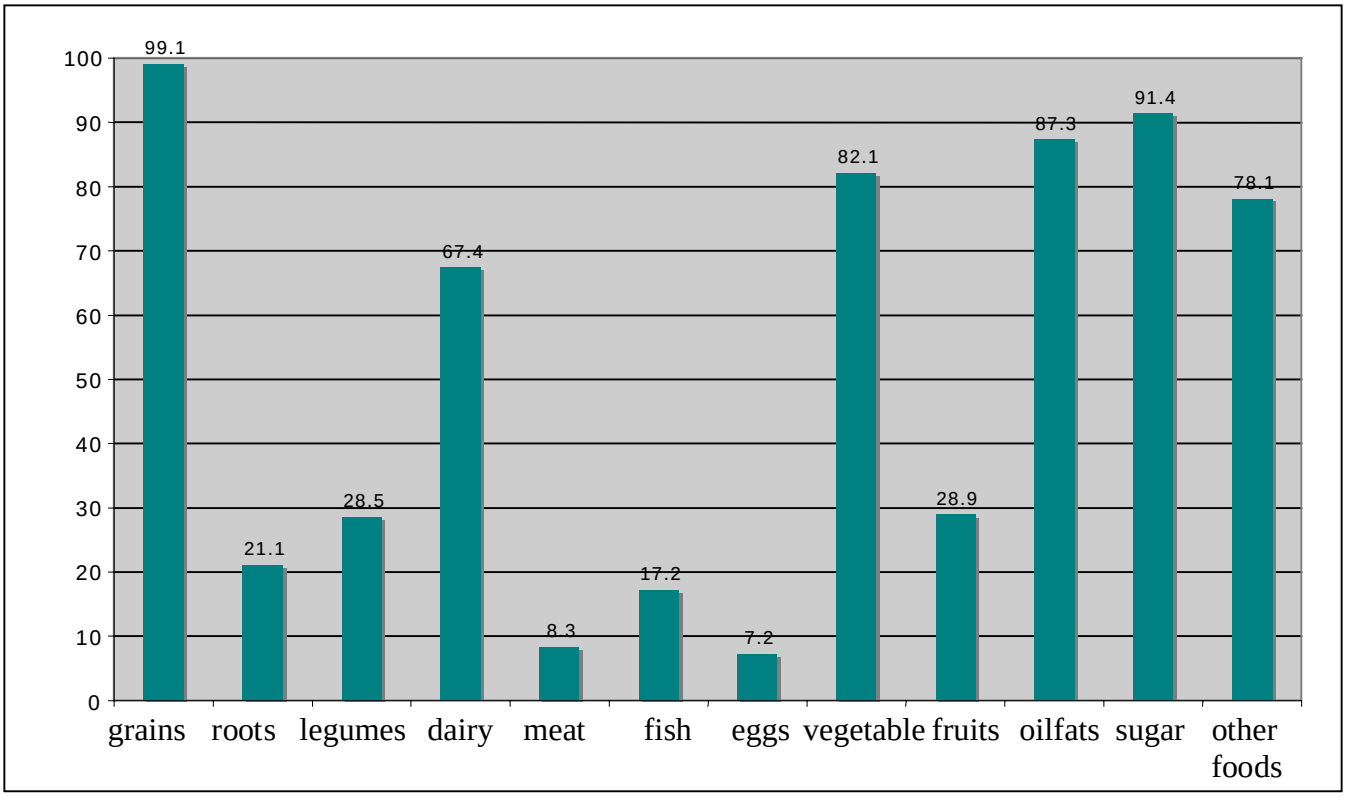

Figure 3:Food groups consumed by the household on preceding day, food groups based on HDDS groupings (n=288)

The most commonly consumed food groups were grains, sugar, oils/fats, vegetables and other foods (i.e. tea, coffee, condiments etc). When doing dietary recalls with respondents it was clear that the primary diet was ugali (grains), sukuma (vegetables, oils/fats for cooking), and chai (sugar, dairy, other foods). Intake of foods rich in protein was generally low, particularly for animal source foods (meat 8.3%, fish 17.2% and eggs 7.2%). (Figure 3) While dairy consumption was quite high at 67.4%, this was mostly due to milk being added to chai, so the quantities being consumed were not substantial

4.1.3 Access to Health Services

Most households were within a short distance of their nearest health facility. The mean travel time one-way was 28 minutes on foot and 18 minutes by vehicle. (Table 4) It was noted during the survey that even households in the same block would not necessarily report the same health facility as their nearest. For example the first house sampled may say the nearest facility was a private clinic that was a 15 minute walk, while the next nearest house reported its closest health facility to be a government dispensary that was a 5 minute walk away. This heterogeneity of response reflects the density of health facilities available in an urban context and the choice offered to slum dwellers. It also reflects the limited coverage of individual facilities.

Table 4: Access to health services by respondent Households

Variable	N	Point estimate	95% CI
Mean distance to nearest health facility in minutes by mode of transport			
Walking	271	27.8 minutes	(24.1-31.5)
By vehicle	14	17.7 minutes	**

**= stratum with only 1 observation so CI note calculated

Most respondents (56%) identified public health centres as being the nearest health care option, followed in equal measure by private hospital or clinics and mission facilities run by faith based organizations. (Figure 4)

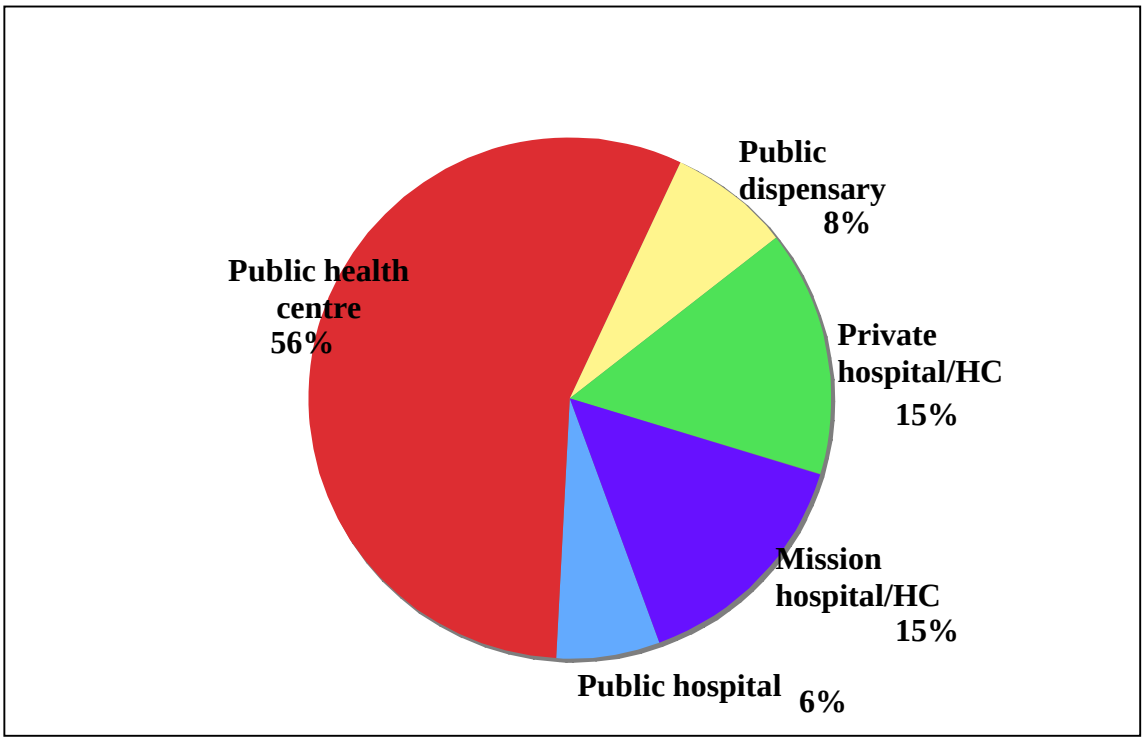

Figure 4: Type of nearest used health facility for respondent households (n=286)

4.1.4 Water and Sanitation

Water was generally readily accessible with the mean travel time to fetch water being under 3 minutes. (Table 5) Main sources of water used by households were public taps, water piped into the compound and water sellers (44%, 31% and 24% respectively) (Figure 5) While a high percentage of respondents had water piped into the compound, most compounds contained more than 10 households so these water sources were shared by many families, similar to public taps.

Table 5:Access to water and sanitation facilities of respondent HH

Variable	N	Point estimate	95%CI
Mean time to fetch water (1 way)	286	2.8 minutes	(1.7-3.8)
Proportion treat water before drinking	287	38.2%	(29.2-47.1)
Types of water treatment used	111[α]		
Filter		0.9%	(0-2.9)
Boil		42.2%	(27.0-57.4)
Waterguard		51.8%	(37.3-66.3)
Settle		0.3%	(0-1.1)
Dispenser		0.1%	(0-0.3)

[α]=Multiple responses allowed

Only 38% of households treated their water before drinking.(Table 5). Of those that did, the most common method of treatment was to use Watergaurd or a similar chemical treatment, followed by boiling. (Table 5)

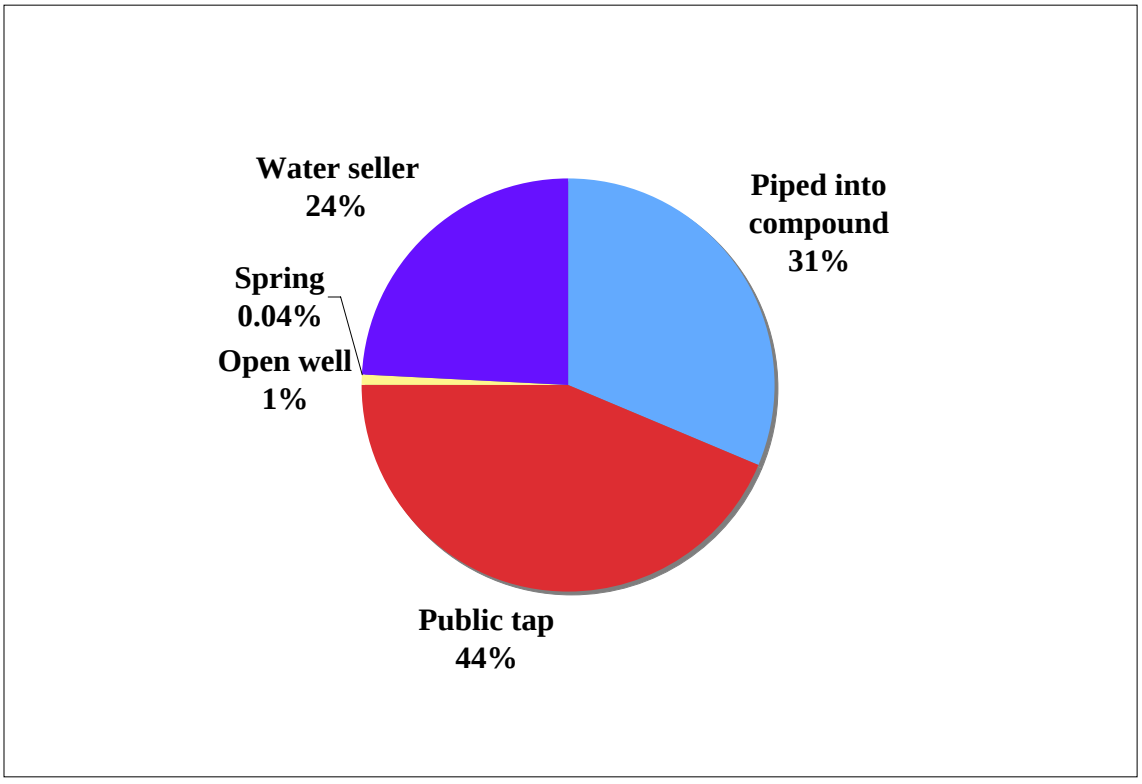

Figure 5: Main household water source of respondent households (n=288)

Most households had access to either a pit latrine or flush toilet, only 1% reported using no facility at all. However, the majority of households that used either a pit or flush latrine shared the facility with more than 10 other families (Figure 6) Furthermore, access to a facility does not translate into constant use and it was observed that many people,

especially children, did not use the latrine for urination, but rather urinated into the open sewers that pervade the slums.

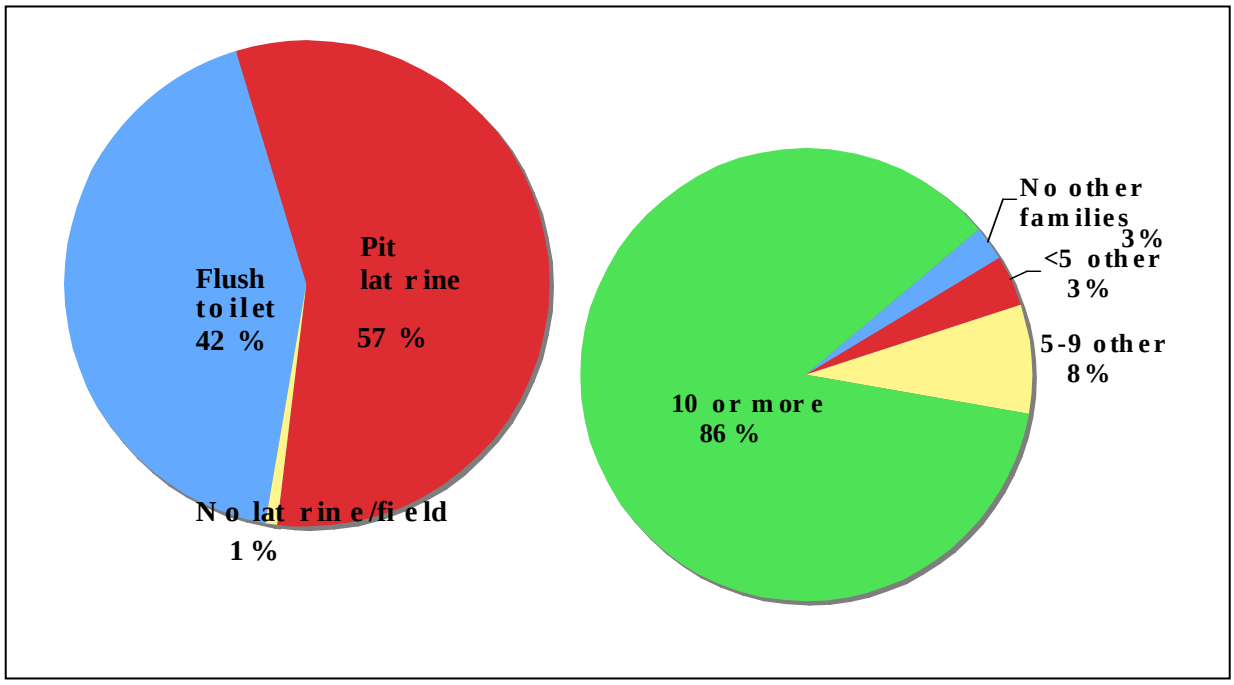

Figure 6: Toilet facilities used by respondent households (n=288) and number of other families they share this facility with (n=283)

4.2 Child Health and Nutrition

4.2.1 Nutritional Status

When calculated according to current NCHS standards the levels of severe acute malnutrition (defined as Weight-for-height z-score <-3 and/or presence of oedema) were very low at 0.06%. When children who's MUAC was below 11.0cm were included in the calculation the prevalence increased to 0.2%. The prevalence represents the proportion of children eligible for treatment in therapeutic care programmes according to current entry criteria.

Like many other countries Kenya is in the process of transition to the new WHO growth standards. For this reason, the prevalence of SAM was also calculated according to WHO standards. When defined as Weight-for-height z-score <-3 and/or presence of oedema according to the new WHO growth standards the prevalence of SAM increased from 0.06 to 0.3. When the new MUAC cut-off of <11.5 cm is included in the case definition the prevalence goes up to 1.9%. This represents a 10-fold increase in the number of children requiring treatment. (Figure 7)

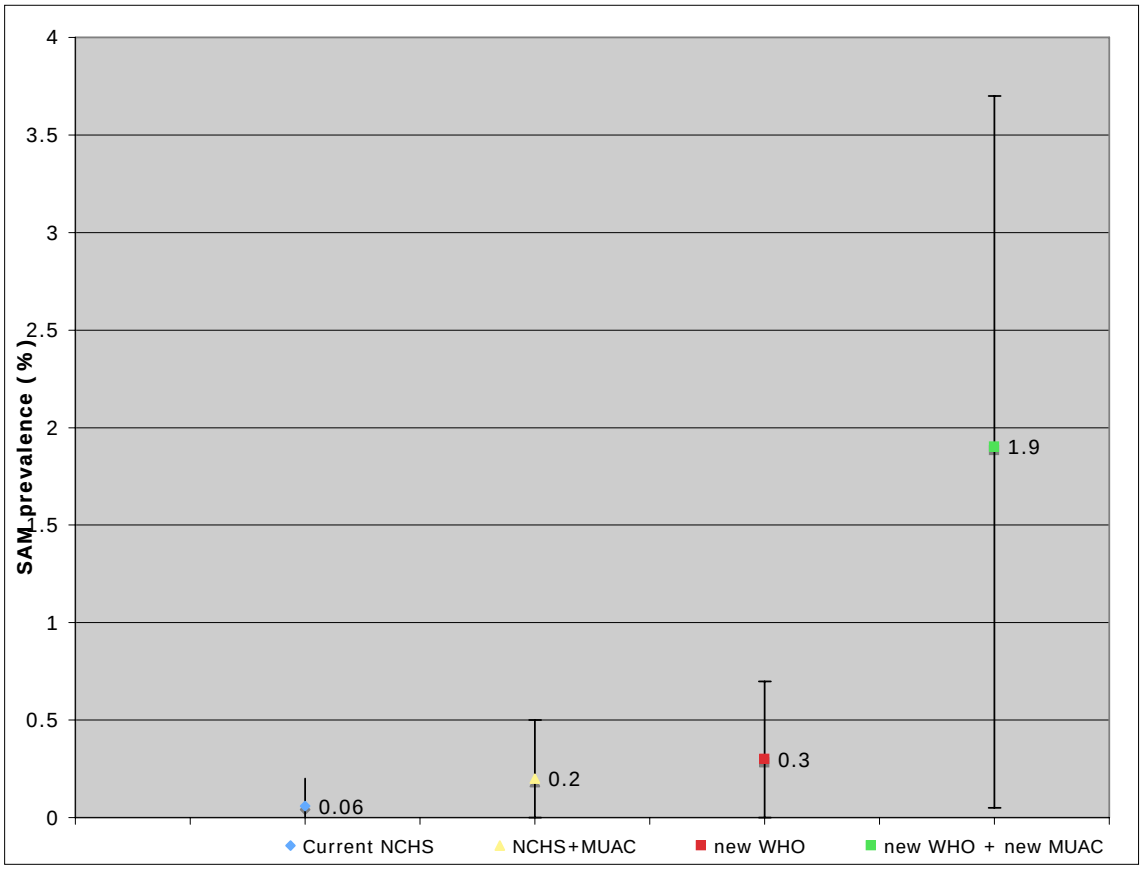

Figure 7: SAM prevalence estimates and 95% CI based on different definitions of SAM.

Global malnutrition rates show a similar, though less marked increase from 1.8% under current standards to 3.5%. (Figure 8)

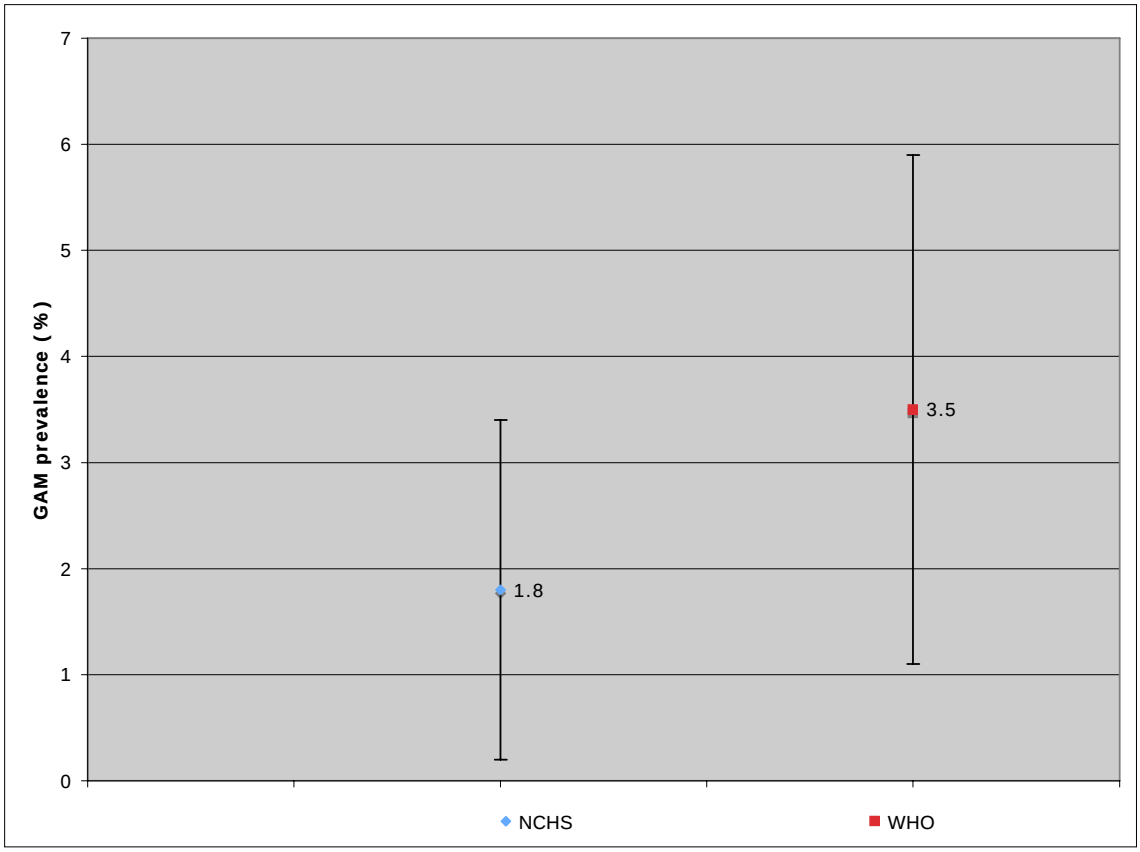

Figure 8: GAM prevalence based on current NCHS definition (oedema and or NCHS Z score <-2) and new WHO definition (oedema and or WHO Z score <-2)

The prevalence of chronic malnutrition was high at 33% according to current NCHS standards and 38% according to the new WHO standards. (Table 6)

Table 6: Prevalence of chronic malnutrition by current NCHS standards and new WHO standards

Variable	N	Point estimate	95% CI
Stunted (<-2 z score) NCHS	286	32.7%	(26.3-39.1)
Severely stunted (<-3 z score) NCHS	286	9.3%	(4.6-14.0)
Stunted (<-2 z score) WHO	286	37.9%	(30.9-44.9)
Severely stunted (<-3 z score) WHO	286	10.6%	(6.5-14.8)

Nutritional status on infants less than 6 months was also measured. Infants were generally well nourished. The mean Weight-for-height, Height-for-age and weight-for-age scores are presented in Table 7. None of the infants included in the survey had a weight-for-height z score below -3. Z scores below -2 were more common with 6.4% of measured infants having WHZ below -2. Five infants were excluded from analysis

because they were below the 49 cm in length for which reference standards were available. (Table 7)

Table 7: Nutritional status of children <6 months

Variable	N	Point estimate	95% CI
Mean WHO Weight-for-height z score	135	-0.07	(-0.3- 0.2)
Mean WHO Height-for-Age z score	135	-0.1	(-0.4- 0.2)
Mean WHO Weight-for-Age z score	135	-0.2	(-0.4- 0.1)
Proportion infants with Weight-for-height <-2	135	6.4%	(1.2-11.5)
Proportion infants with Weight-for-height <-3	135	0%	NA

There are no established MUAC cut-offs to define acute malnutrition in infants under 6 months of age so rather than examining the proportion below or above certain cut-off the distribution of MUAC measurements is presented in figure 9. The majority of infants measured had MUAC above 12 cm.

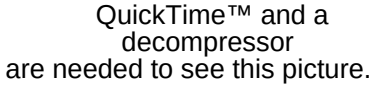

Figure 9: Distribution of MUACs for children less than 6 months (n=135)

4.2.2 OTP Coverage

At total of 27 SAM cases were found in all 10 HCCs where OTP coverage was assessed. Of these 27, 10 were currently enrolled in OTP. When adjusted for strata weights the coverage was 37.7%.

Table 8: Results of OTP coverage assessment in HCCs currently offering OTP services

Total number SAM cases identified	27
Total SAM cases currently in OTP	10
Weighted coverage of OTP services (95% CI)	37.7% (19.4-56.0)

When caregivers were asked why the child was not enrolled in OTP, the majority said they were not aware of a program to help their child. The second most common reason for non-coverage was the caregivers did not recognize the child was malnourished. (Figure 10)

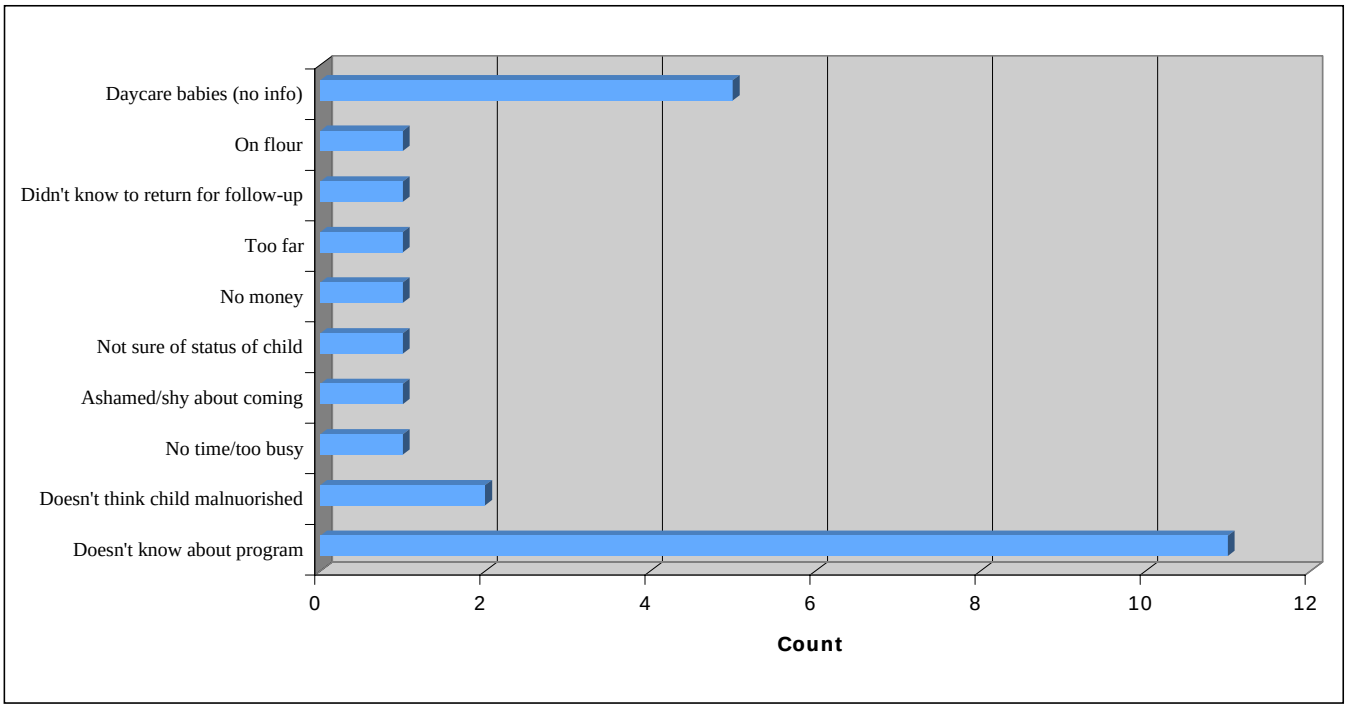

Figure 10: Reasons SAM children were not enrolled in OTP according to their caregivers, multiple responses possible. (n=17)

4.2.3 Vaccination and Micronutrient Supplementation Coverage

Immunization coverage was high, especially for the early childhood vaccines. Full immunization of children from 12 to 59 months however was much lower (52.7%) than the rates for individual vaccinations. This was primarily due to incomplete courses of OPV and/or DPT. (Figure 11)

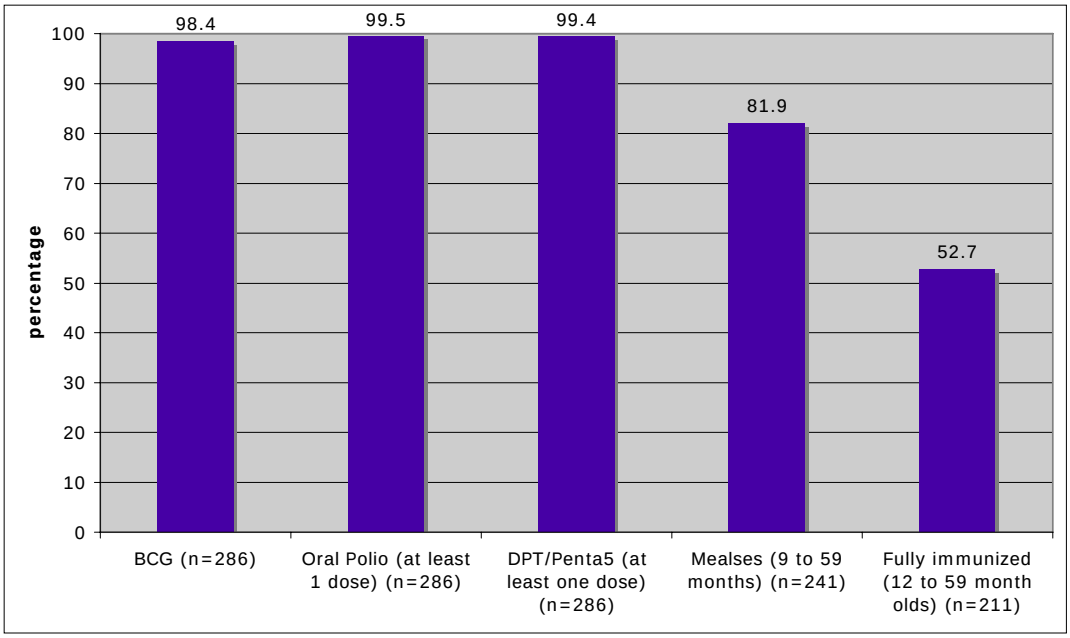

Figure 11: Immunization coverage by vaccination type

Vitamin A coverage in the last 6 months was 58%. Deworming coverage in the last 3 months was lower at only 37%. (Table 9)

According to national treatment protocols, all children presenting with diarrhoeal disease at health centres and clinics should receive 14 days of zinc supplementation in addition to any other treatment. Of the children sampled who had suffered from diarrhoea in the 2 weeks proceeding the survey and been taken to a health facility however, only 16% were reported to have received zinc. (Table 9)

Table 9: Micronutrient Supplementation and Deworming Coverage

Variable	N	Point estimate	95% CI
Vitamin A in last 6 months	285	58.0%	(51.5-64.6)
Deworming in last 3 months (12-59 months)	211	36.6%	(28.1-45.1)
Morbidity in last 2 weeks	285	55.9%	(50.7-61.2)
Proportion with diarrhoea in last 2 weeks	160	43.9%	(45.4-66.7)
Proportion with diarrhoea taken to health facility	56	74.1%	**
Received Zinc for diarrhoea in last 2 weeks	30	16.1%	**

**= stratum with only 1 observation so CI note calculated

4.2.4 Infant and Young Child Feeding

Breastfeeding practices for children under 2 years were generally positive though there is significant room for improvement. Only about half of the sampled children between 6 and 23 months had breastfeeding initiated within 1 hour of birth. Continued breastfeeding of older children however was high, with 70% of 12 to 15 month olds breastfed on the preceding day. (Figure 10) The exclusive breastfeeding rate (as measured using WHO recommendations by the number of 0 to 5 month olds who received only breast milk on the preceding day[12]) was much higher at 56% than expected given previous reports, almost half of infants under six months however still were receiving mixed feeding. (Figure 12)

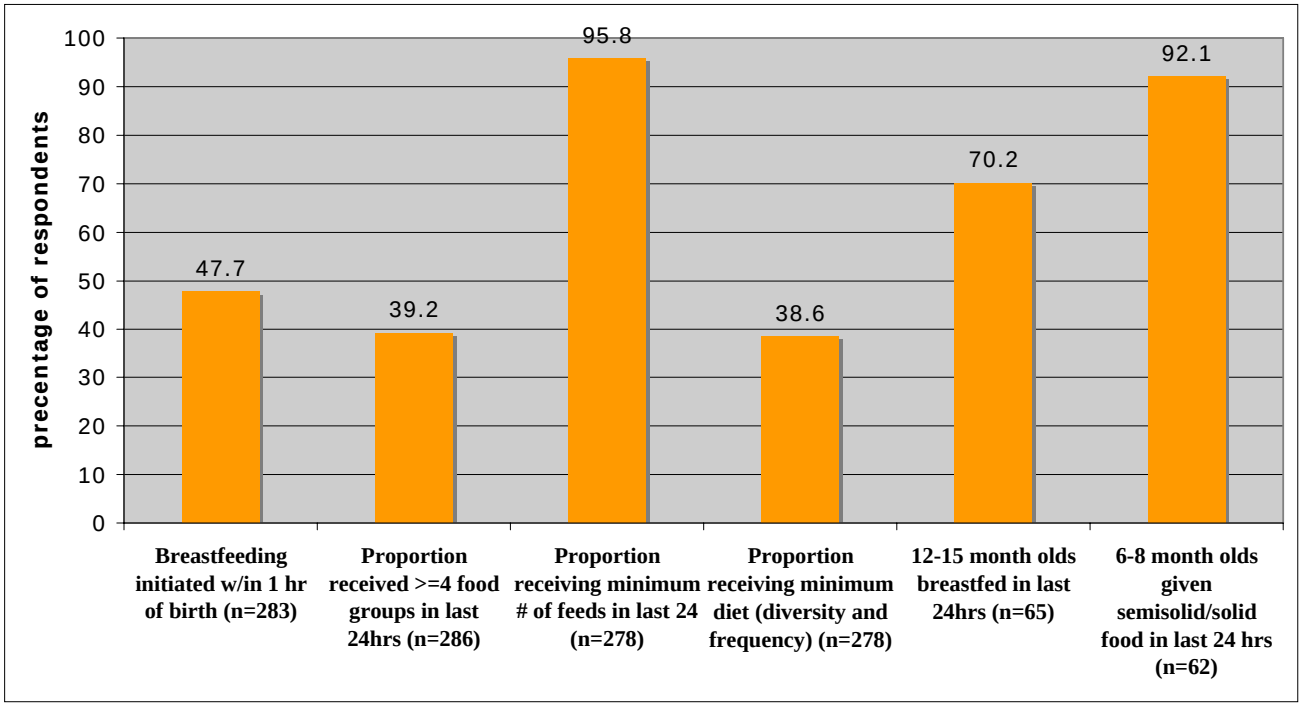

Figure 12: Feeding of young children 6 to 23 months

The proportion of children 6 to 23 months receiving the minimum number of meals per day for their age was quite high at 95.8%, the adequacy of their diet as measured by the individual dietary diversity score (IDDS) however was much lower with only 39.2% of children having received 4 or more food groups on the preceding day. Thus the proportion of children receiving the minimum adequate diet in both quality and frequency was only 38.6%. (Figure 12)

[12] Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held 6–8 November 2007 in Washington D.C., USA.

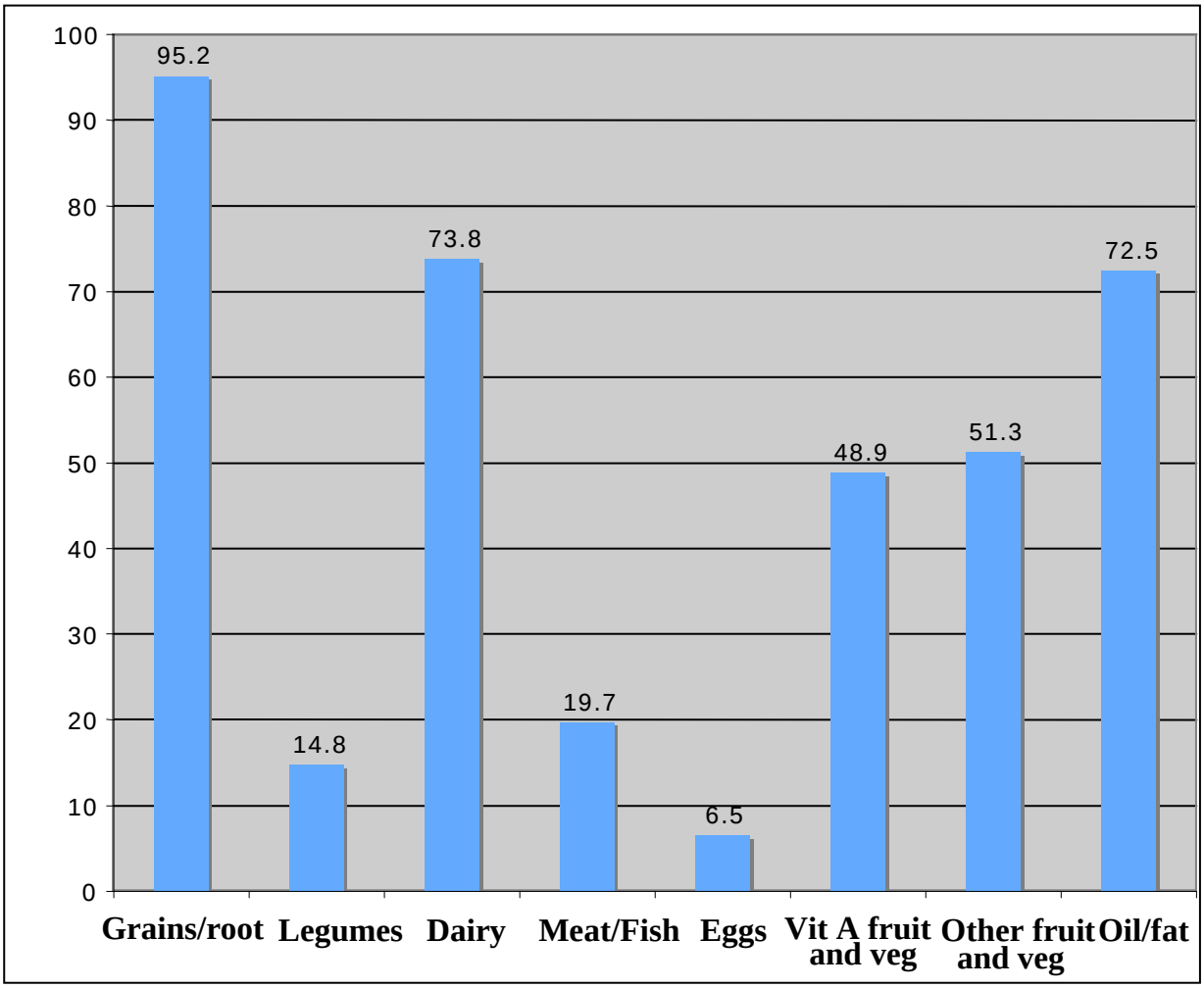

Figure 13: Dietary diversity of children 6 to 23 months based on IDDS food groups (n=287)

When dietary diversity was analyzed by food group, a similar pattern is seen as compared to the household dietary intake with heavy reliance on grains, vegetables, oils/fats and dairy. Protein intake from any source was again very low as was intake of animal source foods. (Figure 13)

Table 10: Mean number of meals and dietary diversity score for children 6 to 23 months on preceding day

Variable	N	Point estimate	95% CI
Mean number of meals yesterday	279	6.0	(5.2-6.7)
Mean IDDS	286*	3.8	(3.5-4.1)

*excluding children on plumpynut[13]

[13] Children on plumpynut were excluded because these children are recieveing a nutritional balanced diet from plumpynut and breast milk alone. Dietary diversity and dietary quality are therefore not correlated in these children.

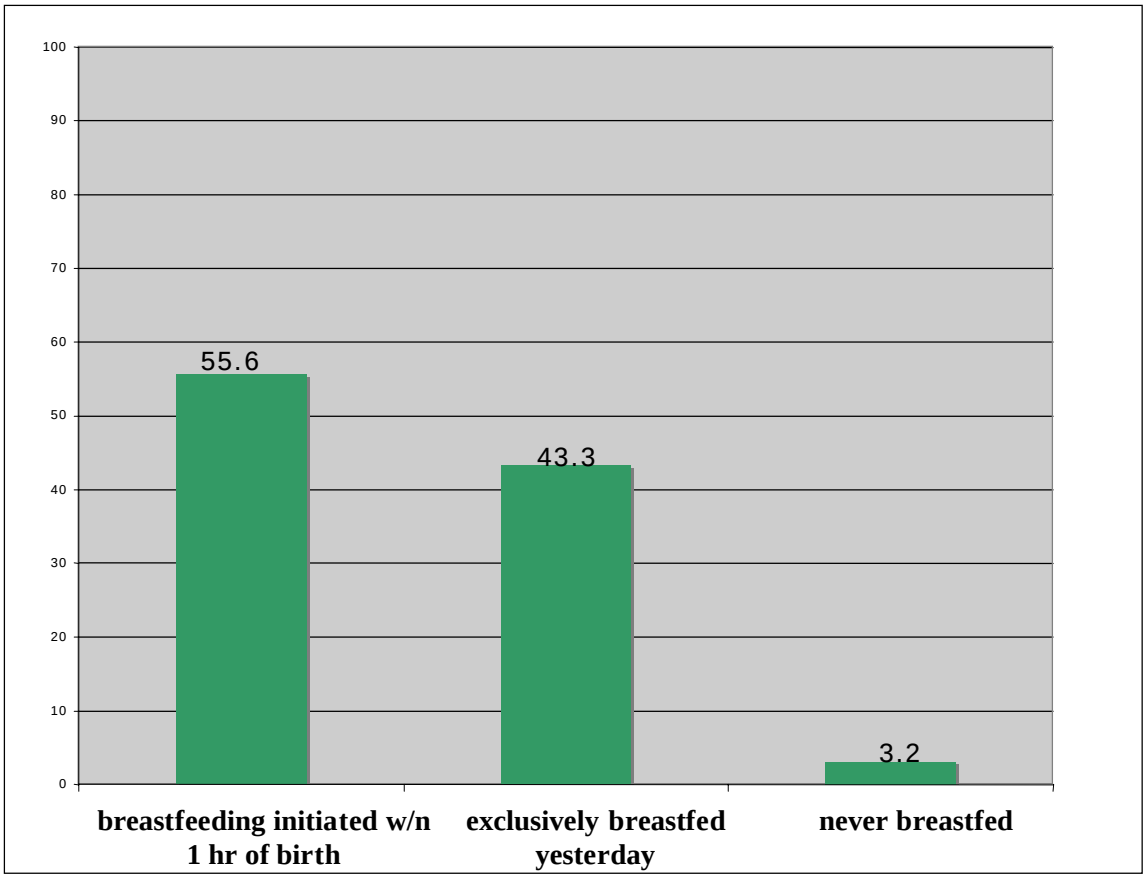

Figure 12: Breastfeeding of children 0 to 5 completed months (n=140)

4.3 Maternal Health

Generally antenatal care (ANC) coverage was high, with 98.5% of mothers attending at least one ANC visit during their last pregnancy. This coverage dropped to 53% however when looking at 4 or more visits, which is the recommended minimum number of visits for pregnant women. (Figure 15)

Encouragingly, almost all mothers who attended at least 1 ANC visit received information on HIV and were referred for testing. The majority of those referred (98.7%) went for testing. Provision of information on breastfeeding and proper nutrition during pregnancy while less common, were still quite high at 79.6 and 72.2% respectively (Figure 15). Only 42.1% of women reported receiving post-partum vitamin A supplementation within 1 month of giving birth.

Only 53% of mothers reported taking any iron/folate during their last pregnancy. Of the mothers who took any iron/folate the mean number of days taken was only 17.4, reflecting very low compliance. (Table 11)

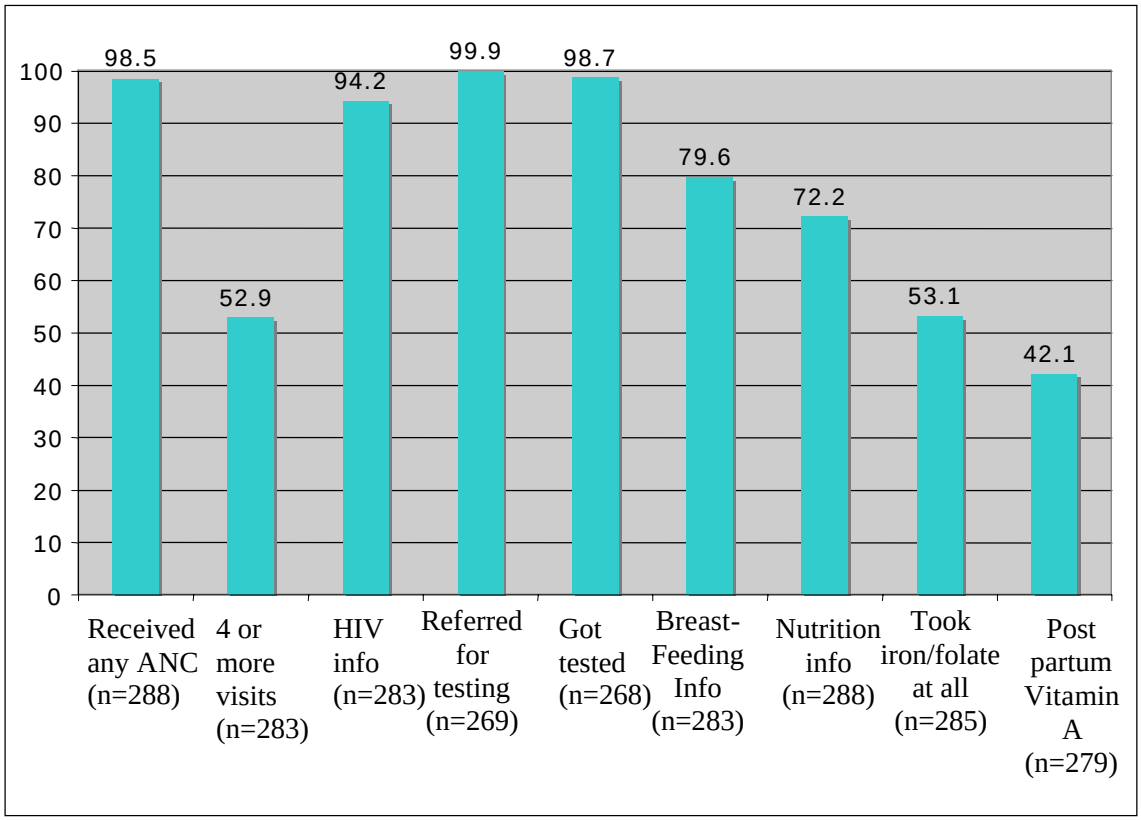

Figure 15: Antenatal care services received during their last pregnancy by women with children under 5 years

Most mothers (60%) relied on public health centres for antenatal care, followed by public, private and mission hospitals in roughly equal proportions. (Table 11)

Table 11: Antenatal Care (ANC)

Variable	N	Point estimate	95%CI
Mean # ANC visits	283	3.9	(3.6-4.2)
ANC type	281		
Public hospital		11.5%	(4.1-19.0)
Public Health centre		60.0%	(48.7-71.3)
Public dispensary		7.7%	(2.4-13.0)
Private hospital/clinic		10.1%	(6.2-14.0)
Mission hospital/clinic		10.7%	(6.9-14.5)
Mean number of days Iron/folate taken	128	17.4	(11.6-23.3)
Proportion of mothers with MUAC <23cm	287	7.5%	(3.7-11.3)
Proportion of mothers with MUAC <21cm	287	1.2%	(0-2.9)
Proportion of mothers with MUAC <19 cm	287	0%	NA

4.4 Maternal Characteristics

The average age of mothers interviewed for the survey was 26 years. Almost half the respondent mothers had completed primary school, 13% had attended some secondary and 9% had completed secondary. Only 2% had never attended school and 1% had completed higher education (either university or a technical course) reflecting a generally high educational level. (Figure 14) Approximately one quarter of interviewed mothers worked outside the home. (Table 12)

Table 12: Maternal respondent characteristics

Variable	N	Point Estimate	95%CI
Mean age	288	26.0	(25.0-26.9)
Mean years education	288	7.9	(7.6-8.2)
Proportion mothers who work outside the home	288	24.5%	(16.5-32.5)

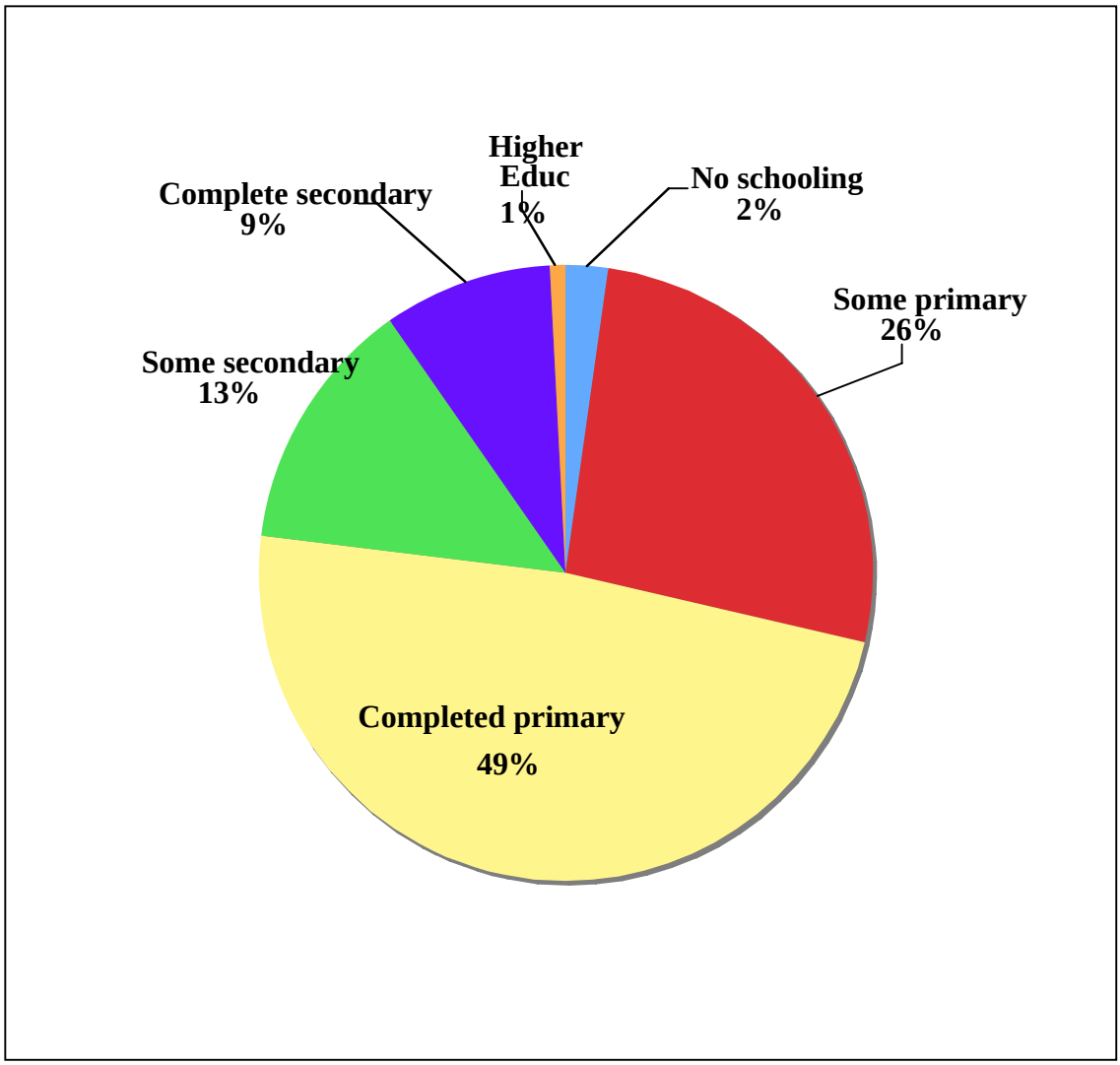

Figure 16: Highest level of completed education of respondents to maternal questionnaire (n=288)

4.4.1 Maternal Hygiene Behaviour and Health Knowledge

Almost 90% of mothers reported washing their hands after using the latrine and 81% before eating. Only 23% washed their hands before preparing food however and only 19% after helping a child with the toilet. Only 0.7% said they never washed their hands. (Figure 17)

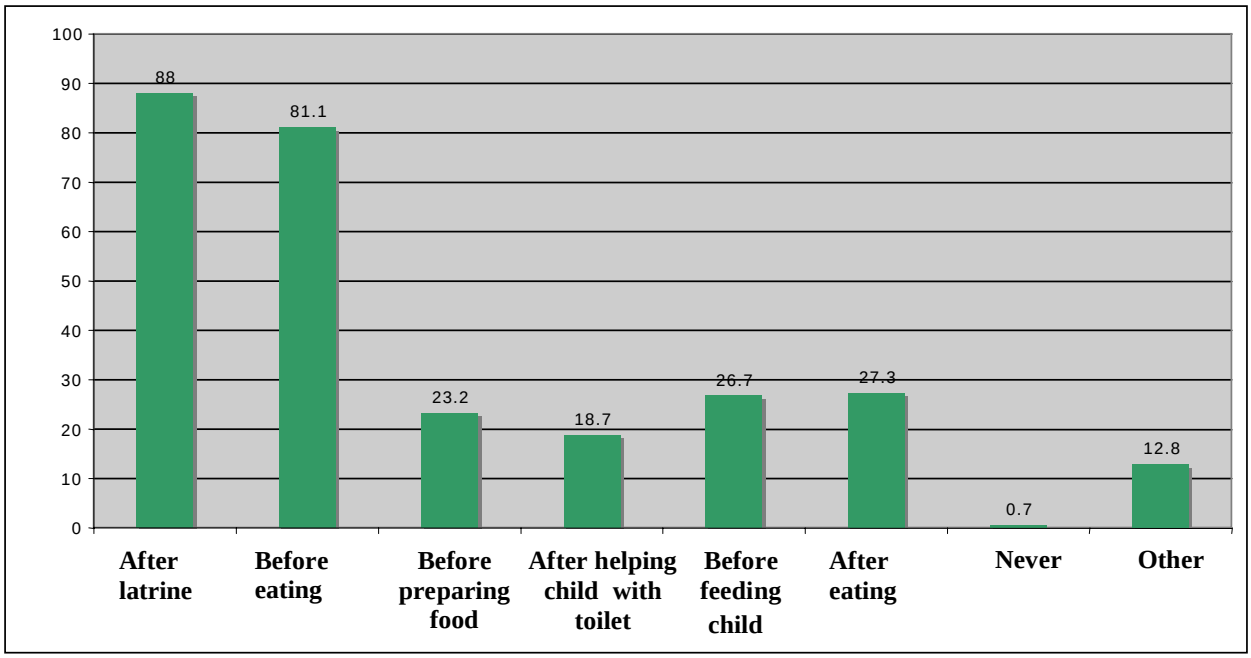

Figure 17: Hand washing behavior of respondent mothers. Mothers were asked at what times during a normal day do they wash their hands. (n=288)

Understanding of the causes of diarrhoea and ways in which it can be prevented reflected a basic understanding that diarrhoea is connected to the hygiene environment, but some confusion over how to maintain a healthy environment. The most commonly mentioned causes of diarrhoea were dirty water and contaminated food (57.7% and 62.1% respectively). 11.6% of mothers misidentified the causes of diarrhoea, ascribing it to contaminated air, witchcraft or mosquitoes and an additional 3.4% did not know the cause of diarrhoea (Figure 18).

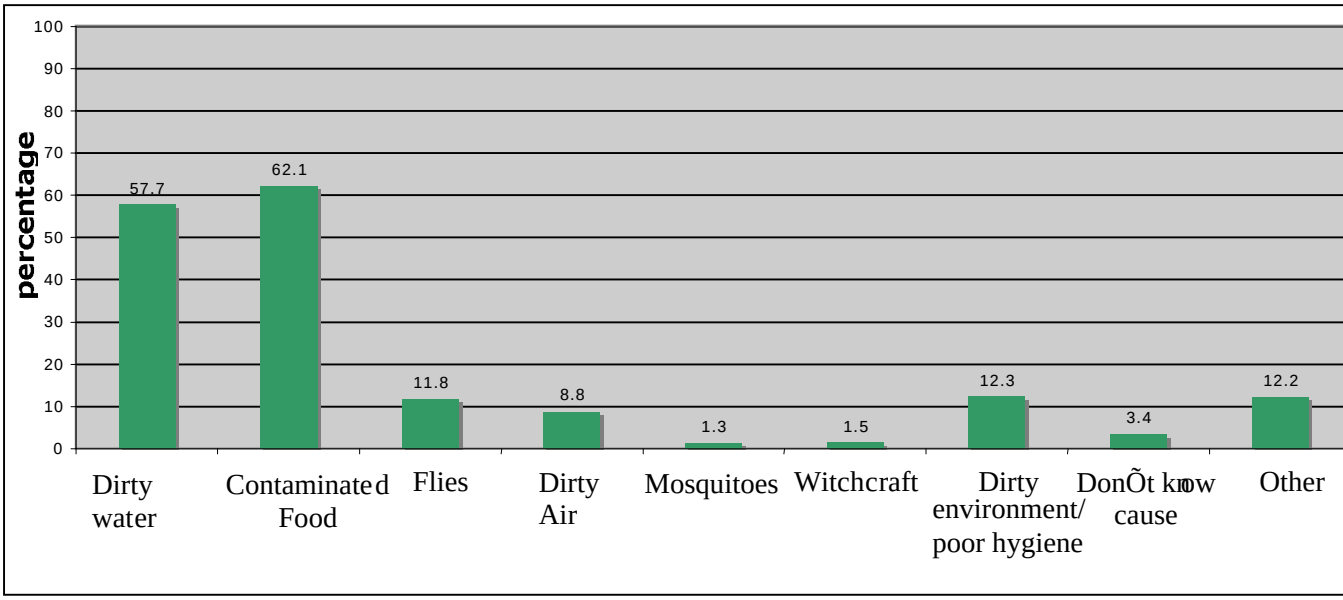

Figure 18: Causes of diarrhoea reported by respondent mothers (n=288)

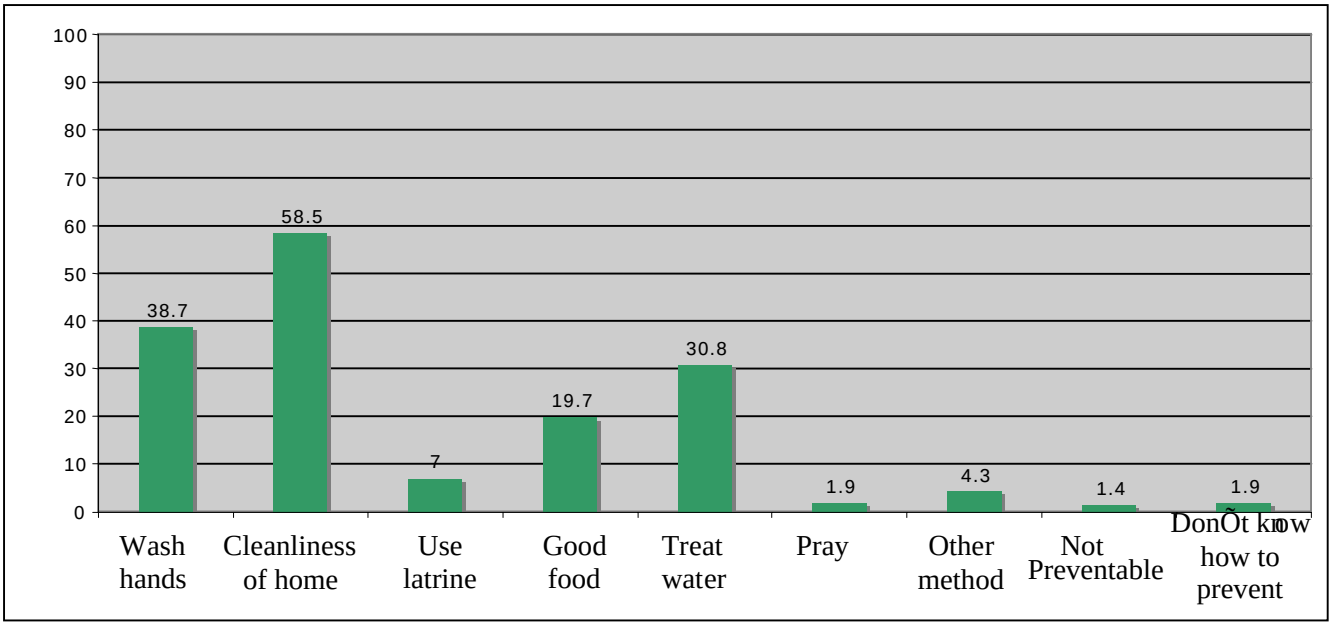

Figure 19: Ways of preventing diarrhoea as reported by respondent mothers (n=287)

When asked how diarrhoea can be prevented, the majority of mothers reported that maintaining the cleanliness of the home was key. Only 40% reported that hand washing was key, 30% that treating drinking water helped prevent diarrhoea and only 7% reported that using a latrine prevented diarrhoea. Thus while mothers connect diarrhoea with a contaminated environment, there appears to be less understanding of how the environment becomes contaminated, i.e through untreated water, dirty hands, open air defecation. (Figure 19)

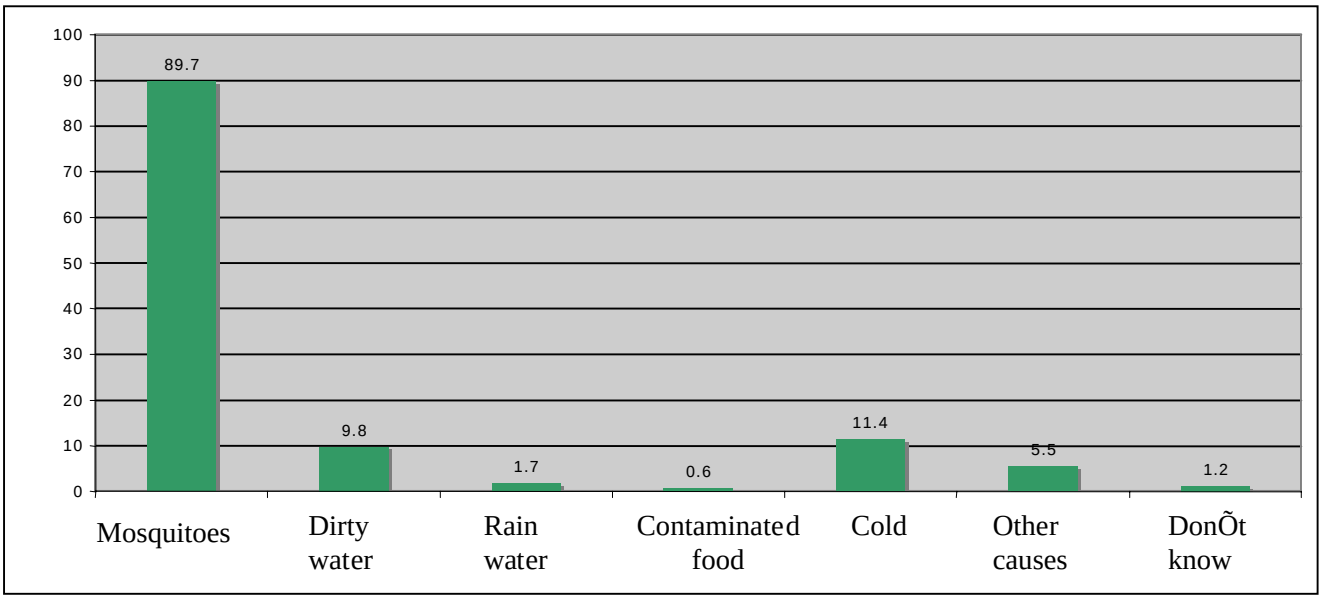

Figure 20: Causes of malaria as reported by respondent mothers (n=288)

Generally, understanding of malaria was better than for diarrhoeal disease with 90% of mothers identifying mosquitoes as the source of malaria and 86% of mothers reporting use of bednets as the way to prevent malaria (Figure 20 and 21). 11.4% of mothers associated malaria with cold, perhaps reflecting confusion over fever due to

malaria vs. fever due to other infections such as acute respiratory infection (ARI) or pneumonia that often afflict children during colder weather. (Figure 21)

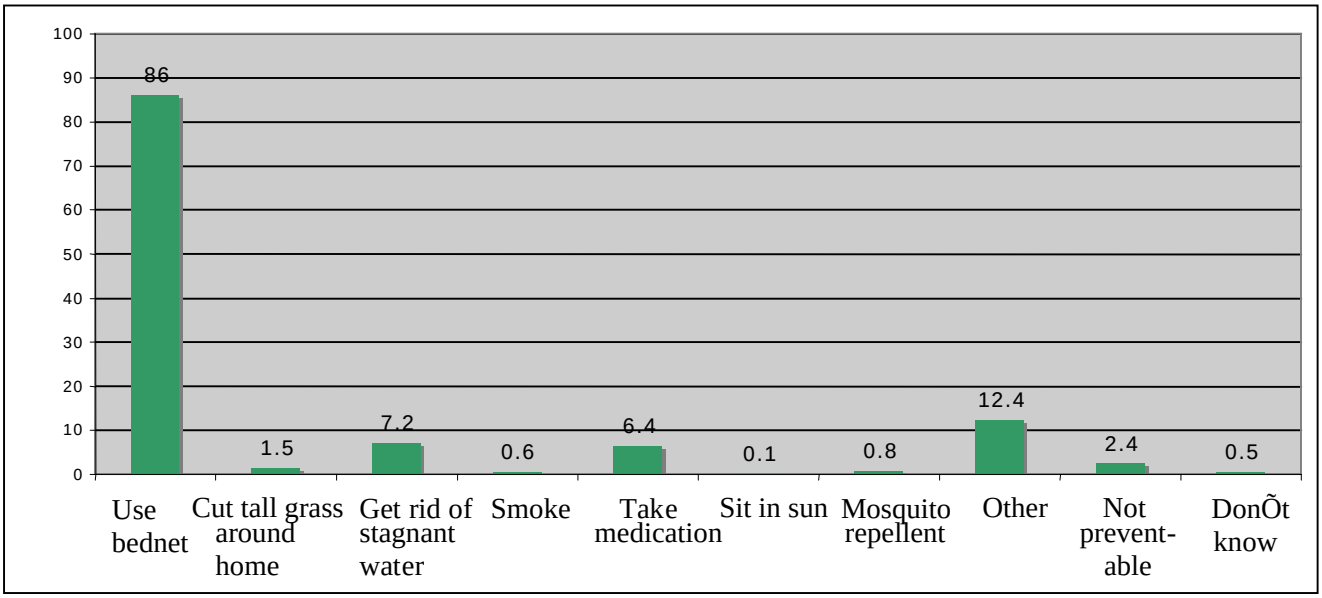

Figure 21: Ways of preventing malaria as reported by respondent mothers (n=288)

Bed net coverage in the surveyed population was quite high with 70% of surveyed mothers having at least 1 bed net in the house. In households with nets, 92% of the children under 5 years had used the net on the preceding day. (Table 13)

Table 13: Bed net coverage, use and purchase by respondent households

Variable	N	Point estimate	95%CI
Mean number of bednets in HH	287	1.02	(0.83-1.21)
Proportion of HH with at least 1 bednet	287	69.8%	(59.6-80.0)
Who used bednet last night	198$^{\alpha}$		
Adult males		72.2%	(61.8-82.7)
Adult females		84.9%	(78.3-91.4)
Children U5		92.0%	(86.8-97.1)
Older children		28.3%	(18.7-37.6)
Proportion receiving free/subsidized nets	193	37.4	(29.5-45.4)

$^{\alpha}$=Multiple responses allowed

Maternal knowledge of vitamin A rich foods was quite low; more than 80% of mothers interviewed could not correctly identify any foods that were rich in vitamin A. 13.4% could name 1 kind of vitamin A rich food, 6.2% could name 2 and only 0.2% could name three such foods. (Table 14)

Table 14: Maternal knowledge of Vitamin A rich food sources and fortified foods

Variable	N	Point estimate	95%CI
Proportion naming a food rich in Vitamin A	287		
One food		13.4%	(8.2-18.5)
Two foods		6.2%	(3.1-9.3)
Three foods		0.2%	(0-0.5)
No foods		80.2%	(72.3-87.6)
Proportion identifying oil/fat as helping body get Vitamin A	235	3.2	(0.6-5.8)
Proportion heard about fortified foods	279	30.0	(21.1-38.9)
Types of fortified foods	96[α]		
Cooking oil		27.8%	
Margarine		20.6%	
Flour		29.5%	
Salt		2.7%	
Other		25.2%	

[α]=Multiple responses allowed

Knowledge of fortified foods was also quite low; only 30% of mothers interviewed had heard of fortified foods and when asked which kinds of foods are fortified many named fruits or vegetables that cannot be fortified rather than processed foods. (Table 14) This may reflect some confusion by mothers or fortified foods vs. foods naturally rich in vitamins and minerals.

4.5 Malezi Bora

Malezi Bora is a biannual child and maternal health campaign run through government health facilities in Kenya and supported by UNICEF. The central activities of Malezi Bora are child immunization and micronutrient supplementation, health and nutrition education for mothers and provision of antenatal care and referral. Just over half of surveyed mothers had heard of Malezi Bora (Figure 22). However, when asked about what happens during Malezi Bora the majority of mothers (61.2%) did not know any of the activities of the campaign. (Table 15) Sixteen percent of mothers surveyed had not heard of Malezi Bora but were aware of a campaign for child immunization and health education. (Figure 22)

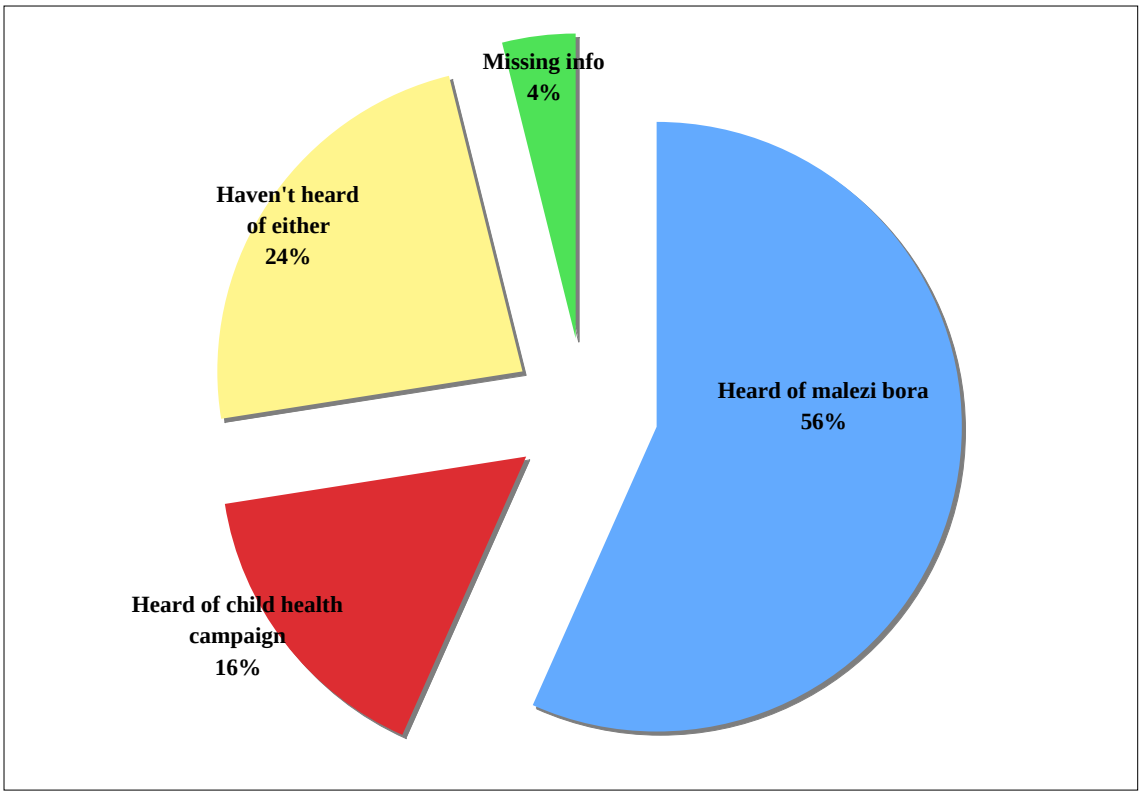

Figure 22: Awareness of Malezi Bora by respondent mothers. Mothers who had not heard of Malezi Bora were asked if they were aware of a general child health campaign to capture those mothers who did not know the name Malezi Bora but were aware of the campaign. (n=288)

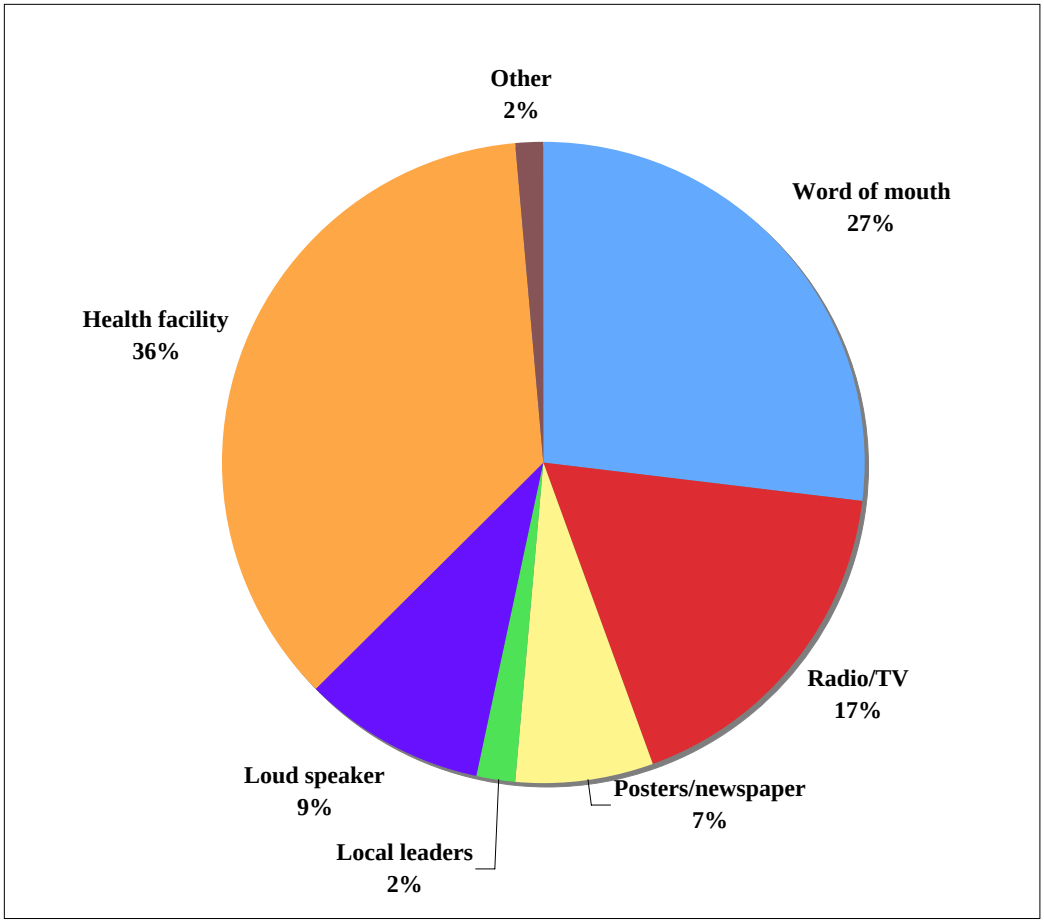

Figure 23: Method of hearing about Malezi Bora or general child health campaign (n=204)

Most mothers who knew of the campaign found out about it through health facilities (36%) or general word of mouth (27%). The other major sources of information about the campaign were radio/TV announcements, loudspeaker announcements and posters or print advertisements. (Figure 23)

Table 15: Understanding of Malezi Bora activities and attendance at last campaign

Variable	N	Point estimate	95%CI
Malezi bora activities	179$^{\alpha}$		
Child immunization		7.3%	(1.4-13.1)
Health education		30.9%	(20.3-41.4)
Supplementation		10.5%	(4.4-16.7)
Don't know		61.2%	(48.9-73.5)
Other		3.1%	(0-7.1)
Attended themselves	216	37.4%	(26.5-48.3)
Children attended	85*	88.7%	(80.2-97.2)
Children attend excluding maternal DNA	79	89.6%	(80.3-99.0)

*Some children attended but their mothers did not attend, however children's attendance if the mother did not attend was not systematically asked

$^{\alpha}$=Multiple responses allowed

While 72% of mothers had heard of Malezi Bora or a general health campaign, only 38% attended the last time the campaign occurred. (Table 15) When asked why they did not attend most mothers cited lack of sufficient knowledge about the

campaign or why it was important to attend. Six percent of mother also reported that the services received were not worth the time required to attend. Sixteen percent of mother said it was too far away, suggesting that further decentralization of campaign activities may be required to improve coverage. (Figure 24)

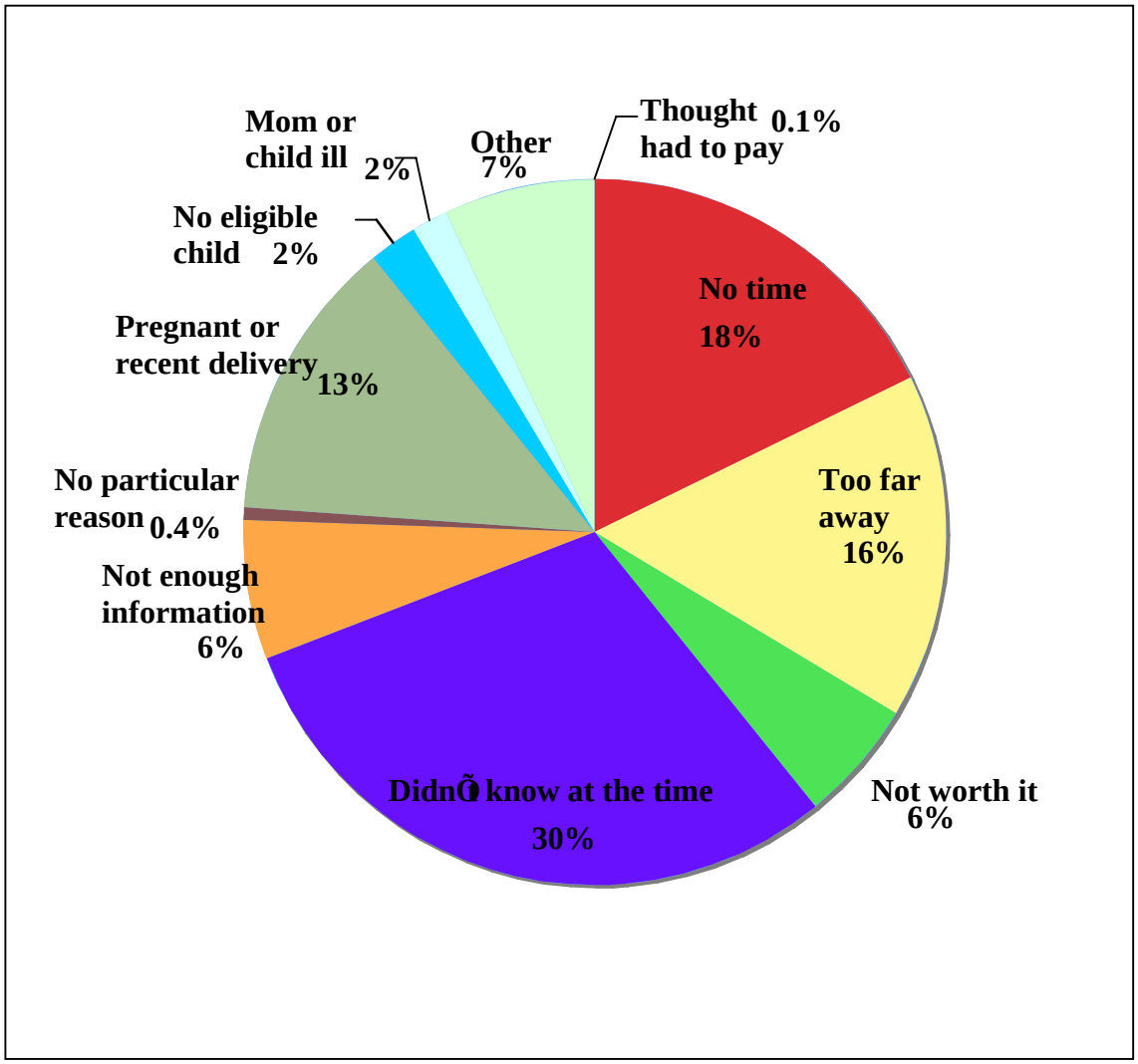

Figure 24: Reasons for non-attendance at the last Malezi bora/child health campaign (n=114)

5. Limitations

While much can be concluded from this baseline about maternal and child health in the slums, there are several important limitations to this study and the inferences that can be made from it that should be kept in mind when interpreting the results.

First among these is that while the survey methodology sought to provide a representative sample of mothers and children under five in the sampled areas, the sample was ultimately blimited to those mothers and children present on the day of the survey. On the ground, the survey teams encountered many locked doors and absent residents. Wherever possible the teams attempted to determine if eligible respondents lived in the household and to return later to sample them. While many of the absent households were single person households; generally young men who rented rooms and had migrated to the city to find work, some belonged to working

mothers. These women tended to leave home very early, leaving their children with relatives or at a daycare centre and return only in the evening. Due to security, sampling at night was not possible so these mothers and their children were not included in the sample. Whether the health outcomes of these children and mothers are significantly different from those sampled is not known but it is possible that these children are worse off than those sampled as they have less maternal contact. These households may be more likely to be female headed and therefore more vulnerable with fewer social and economic supports. It must be acknowledged therefore that the sample presented here is biased towards stay at home mothers and their children and does not represent the whole slum population.

Similar to working mothers, pavement squatters who lacked a house structure were likely to be missed by the sampling as teams selected respondents based on proximity of their front door to the last sampled house. Homeless mothers and their children would therefore be missed by this methodology. These mothers and children are expected to be the most vulnerable and prone to malnutrition. They are also transient and make up a very small fraction of the overall slum population; therefore it is difficult to find them and include them in a sample along with settled respondents in a representative way. To gather information on this sub-population, purposive and/or snowball sampling would be more appropriate, unfortunately this separate sampling was beyond the scope of this assessment.

As described in the methods section the sampling frame for some HCCs had to be adjusted once teams were on the ground due to new information about the exact location of the slum areas. All changes to the sampling frame were noted and the complete list of EAs updated after fieldwork was completed. This issue could be avoided during the end line assessment by allowing more time for mapping and development of the sampling frame. The mapping process should be begun well in advance of the survey fieldwork and build on the information gathered for this assessment allowing for slums maps to be verified through field visits by the nutrition team before sample selection starts. The census will be repeated in August of this year. The updated population figures and maps produced from this should be obtained and used for the end line assessment as these will more accurately reflect the population levels at the time of the end line.

It was originally planned to collect qualitative data through a series of focus group discussions (FGDs) with slum dwellers and other key informants to augment the quantitative data collected in the survey. Survey supervisors were to conduct FGDs in the same areas were teams were conducting quantitative data collection starting on the 6th day of fieldwork and continuing until fieldwork was complete. Due to demonstrations by Mungiki and other student riots however, the security situation in the slums deteriorated such that it was not feasible to split teams. For safety it was decided that supervisors should stay with their teams throughout the day in case the teams needed to evacuate the slums quickly. This meant that only one day of focus groups discussion was conducted rather than the planned four days. The amount and variety of qualitative information gathered was therefore limited and may not be representative of the entire surveyed population. Despite this the information gathered in the 5 focus groups carried out is still very useful and adds depth to the quantitative information.

To measure coverage of current OTP services, teams sought to find all or almost all SAM children in the selected area. Following international practice for OTP coverage surveys, active and adaptive case finding was used to identify SAM children. This method relies on local key informants to identify potential cases and

then screen them for SAM. In rural settings this method has been shown to be as effective as door-to-door screening and much less time consuming.[14] In the slums however, finding key informants proved challenging as population densities were high and households tended to be less connected to each other than in a rural setting. Thus a key informant could generally only show teams children among their immediate neighbours (within the same compound or block) rather than across the whole area sampled. Based on this experience it seems that door-to-door screening may be a more appropriate method for assessing coverage of OTP services in slums. This would require significantly more time however.

6. Discussion/Conclusions

Child nutritional status

Prevalence of severe acute malnutrition was quite low in the surveyed areas. According to current case definitions (based on oedema, NCHS standards and a MUAC cut-off of <11 cm) the prevalence of SAM was only 0.2%. While compared with commonly used emergency thresholds[15] this is well below critical levels, however it also masks the scale of the problem to an extent. In an area of relatively low population density a SAM prevalence of 0.2% will translate into only a handful of cases requiring treatment. In the slums however, because of the very high population density, even this minimal prevalence translates into high absolute caseloads. To take the example of Mathare, just one of the larger slums in Nairobi with an estimated population of 423,000 people;[16] assuming 20% of these are under 5 years old a SAM prevalence of 0.2% translates into a caseload of 169 cases requiring treatment at the one government health centre serving the area. When the new case definition in the forthcoming National Guidelines is applied, based on WHO growth standards and a MUAC cut-off of <11.5 cm, the caseload increases dramatically, from 169 to 1,607 based on a 10-fold increase in prevalence from 0.2 to 1.9%. This has substantial resource implications.

Chronic malnutrition as measured by stunting rates was also a significant problem in the slums representing a loss of both physical and mental potential for affected children. Compared to Nairobi Province as a whole (18.7% stunting), children in the slums sampled (32.7% stunting) were 2 times more likely to be stunted indicating a high level of disparity in nutritional outcomes across Nairobi Province.

Outpatient Therapeutic Programme (OTP) coverage

The current OTP coverage of 37.7%, while still below SPHERE targets, represents an important improvement in the last year when therapeutic cares services for SAM children were only available at the central hospitals. OTP coverage needs to almost double however, to reach the SPHERE standard for an urban area of 70% coverage.

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[14] Myatt, M., Feleke, T., Sadler, K., and Collins, S. 2005. A field trial of a survey method for estimating the coverage of selective feeding programs. *Bulletin of the World Health Organization*. 83: 20-26.

[15] WHO. 2000. The Management of Nutrition in Major Emergencies. WHO, UNHCR, IFRC, WFP.

[16] "The Nairobi slums/informal settlements, An emerging food security emergency within extreme chronic poverty: A compilation and synthesis of key food security, livelihood, nutrition and public health data." 2009. Oxfam, Concern Worldwide and CARE international.

The primary reason for SAM children not being enrolled in OTP was lack of knowledge about the service. Several mothers reported that they had been referred to Mhagathi hospital by private or mission clinics for therapeutic care for their child but did not go because of the distance and expense involved; these mothers were unaware that therapeutic services were offered at their local health centre. This indicates a need to strengthen referral links between private and mission health centres and local OTP services in the areas they serve.

Several of the SAM cases found were discovered at daycare centres. For these children it was not possible to get information on why they were not enrolled in the local OTP because their caregivers were not present. However, it also suggests that a potentially important link for outreach and referral would be to target daycare centres, which see a high proportion of slum children many of whom may be at greater risk of malnutrition because they have much less maternal contact.

Vaccination and Supplementation

Vaccination coverage was very high; almost 100% for single dose vaccinations and the majority of children included in the sample had health cards. Full immunization by 12 months however was much lower than the rates for single vaccinations, falling to 52.7%. This was mostly due to children not receiving the full course of OPV and/or DPT/penta 5.

Vitamin A coverage was higher than expected at 58% given previous reports and was 25 percentage points higher that levels reported in the 2003 DHS. At just under 60% there remains room for further improvement however. Deworming coverag was much lower at only 37% for the last 3 months. This may be due in part to the recent change in protocols that increased deworming frequency from every six months to every 3 months.

By far the lowest coverage was for zinc supplementation during episodes of diarrhoea. While it is encouraging that 74% of children suffering diarrhoea were taken to a health facility for treatment, only 16% of these children received zinc. Whether this poor coverage was due to lack of training of the staff, lack of supplies, or both, is unclear and should be investigated further.

Infant and Young Child Feeding

Complimentary feeding of children 6 to 23 months of age was adequate in terms of frequency but not quality of foods given as measured by dietary diversity. Young child diets were particularly lacking in animal source foods and legumes, both important protein sources. This mirrors the intake patterns seen at the household level suggesting that it is lack of household access to protein rich foods, particularly animal source proteins, that may be the limiting factor in proper child feeding. An effective strategy for dealing with diet quality of young children may therefore be to increase household incomes and/or access to animal source proteins through cash transfers or similar programmes. In addition to augmenting household incomes, another avenue for intervention may be the communal cook pots in the slums. Because of the high price of cooking fuel, many slum households buy precooked beans and/or grains from sellers who prepare large pots and then sell by the cupful. Targeting these sellers with key subsidized protein rich foods to include in their communal cook pots could also be an effective way of increasing household protein consumption, provided that the cost of including these protein rich food was not passed on to the consumer.

Breastfeeding practices were generally encouraging given previous reports of very low exclusive breastfeeding (EBF) (13% in the 2003 DHS). It should be

remembered however, that the indicator used in this survey (as outlined by WHO standard IYCF indicators[17]) is based on breastfeeding on the preceding day and not since birth. It is acknowledged that this indicator may overestimate the prevalence of exclusive breastfeeding as those children who are only sporadically given other liquids may be classified as exclusively breastfed. The effect of this is not expected to be substantial however. Another potential reason for this high level of EBF compared to previous estimates is that the majority of children sampled for the 0 to 5 completed months sample were in fact under 2 months old. It has been well documented in Kenya that early introduction of complimentary foods is generally around 2 months of age, a fact that was echoed by focus groups conducted as part of this baseline.

At 56% EBF while much higher than expected, still indicated that over 40% of infants were being mixed feed, increasing their risk for gasteroinestinal infection and HIV infection in exposed children. Additionally, because of the high prevalence HIV in the slums and the proliferation of messages around breastfeeding or replacement feeding practices for HIV positive mothers further attention should be paid to breastfeeding practices. Qualitative data collected during the assessment suggests that different health facilities are giving conflicting messages to mothers around breastfeeding and HIV with some advising exclusive breastfeeding until 6 months followed by abrupt cessation, while others council HIV positive mothers not to breastfeed at all, or only to breastfeed if they are on medication according to slum residents interviewed. These multiple messages lead to confusion among mothers and mixed feeding as a result. On top of the public health messages around breastfeeding, the slums also have a very rich ethnic mix with groups from all over the country, each with their own set of beliefs and mores around breastfeeding. For instance among some groups wet nursing is highly acceptable, while in other groups this would be seen as a stigmatizing practice.[18] There is a need to harmonize breastfeeding messages given through the health system, both public and private, and also to better understand the commonly held beliefs around breastfeeding in the target populations to more effectively tailor messages.

Maternal Health/Antenatal Care

The high level of attendance at antenatal care is positive as is the almost universal provision of information and referral for HIV testing. Focus group participants also mentioned that of the advice given at the health centres, they were most able and willing to follow guidance on antenatal care. Despite this, only about half of mothers attended the recommended four or more ANC visits during their last pregnancy. One reason for this may be linked to the high coverage of HIV testing and referral. Some health workers reported that many mothers who are referred for testing on their first visit and subsequently receive a positive test result do not return for follow-up ANC. Another potential reason is that mothers are presenting for their first ANC late in their pregnancies so there is not time for 4 visits before delivery. Further investigation of this is warranted to determine what factors contribute to low attendance of four ANC visits.

Despite high contact with ANC services, coverage of iron/folate supplementation during pregnancy was very low. Only 53% of mothers took any iron/folate during their last pregnancy. Of those that did the mean number of days

[17] Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held 6–8 November 2007 in Washington D.C., USA.

iron/folate was taken was only 17, indicating poor compliance among those women receiving tablets. Iron/folate supplements have several common side effects such as constipation that can be significant barriers to completing the course of supplementation. Counselling on taking the tablets with plenty of water as well as health education about the importance of iron/folate during pregnancy should be strengthened to address the poor compliance of mothers.

Malezi Bora

The baseline assessment revealed significant shortcomings in maternal understanding and prioritization of Malezi Bora. Of the mothers who had heard of Malezi Bora most did not know any of the activities that took place as part of it. Increased community mobilization is required to improve attendance levels at subsequent Malezi Bora campaigns. Currently, the primary source of knowledge about Malezi Bora was the health facilities and practitioners themselves. While it is positive that health practitioners are spreading the word about Malezi Bora, mothers who are already regularly attending the health facilities with their children are not the key target for a child health campaign. Rather, priority for mobilization and sensitization should be placed on mothers who are not regularly accessing health services, whose children may not be up to date with immunizations and will likely have had less exposure to key nutrition and health messages. To reach this population focus should be placed on reaching people through mass media, and targeting outreach through non-health sector related actors. Targeting daycare centres and their staff to help mobilize for Malezi Bora may prove useful as many mothers who work outside the home leave their children at these centres. Recruiting local shopkeepers to spread the word and displaying posters and print media in the small shops that primarily serve the slums would also be an opportunity to reach a wider audience, particularly those mothers who do not regularly attend health centres.

7. Recommendations

The results of this baseline assessment point to several key actions that should be taken to improve coverage of basic health services in the project areas in Nairobi East and Nairobi North.

OTP Coverage

While OTP coverage is nearing 50% and is higher than coverage reported for some long running outpatient care services, it is still below the SPHERE standard of 70% for an urban context. This, in conjunction with the high projected caseload within the slums of Nairobi, indicates that further decentralization of services to more centres should be prioritized. In addition, community mobilization and outreach should be strengthened and expanded to ensure that all eligible children are accessing services.

From the questionnaires of uncovered SAM cases it is clear that 2 key areas currently being missed by community mobilization are referral links between private healthcare providers and public health centres and daycare centres. Several of the uncovered SAM cases found, particularly those suffering from HIV, were accessing regular healthcare at a private or mission health centre that did not offer OTP services. Despite their regular contact with health professionals, they had not been referred to the OTP in their location. Sensitization and training with health workers at private and mission run health centres on the signs of SAM and OTP referral could

substantially improve coverage. Because of the correlation between HIV, TB and SAM, centrs offering HIV and TB services should be primary targets for this sensitization. Targeting HIV support groups and HIV focused CBOs would also be an important link to improving OTP coverage.

Many of the uncovered SAM cases found in the survey were in daycare centres because their mothers worked outside the home. Daycare workers are another key linkage that should be prioritized as part of community mobilization. Because of the heavy reliance on wage labor for income in the slums many children are cared for during the day by formal and informal daycare centres. The workers at these facilities have contact with a high number of children, so training them in the recognition of SAM and referral to OTP would be an efficient way to increase coverage.

Malezi Bora

It is evident from this assessment that attendance of Malezi Bora by slum residents is quite low and much of this poor attendance stems from lack of information and understanding about what Malezi Bora is and why it is important to attend. Community mobilization and sensitization around this campaign should therefore be strengthened with particular emphasis on targeting media outlets frequently used by slum dwellers.

The animal source foods Gap

It was evident from both household and child dietary diversity analysis that intake of animal source foods is almost universally low in the slums. This agrees with surveys and sentinel site surveillance done by ACF that found similarly low rates of intake.[19] More investigation is needed to better understand what limits intake of these foods and to determine what types of interventions are appropriate to improve protein intake, particularly of animal source foods.

Micronutrient supplementation

While Vitamin A supplementation levels are encouraging they can be improved still further and substantial improvement should be made on deworming and zinc coverage. The first step to determining why deworming and zinc levels are low is to determine if it is a knowledge gap of health workers, a supply gap of the supplements, a lack of contact with the children/caregivers to give them the supplements or a combination of the three. In the case of zinc it is clear that most children suffering from diarrhoea are being taken to health facilities where they should receive zinc, therefore the shortfall is not in contact with the health system. The Ministry of Health should be supported to determine why these supplementation levels are falling short and how they can be improved.

Maybe one sentence to say key findings will be disseminated to health facilities and chiefs and shared at National Level and relevant stakeholders. Concern is planning to discuss ways to action the recommendations with their partners.

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9. Annexes

[see separate file]