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West Jabel Mara locality Nutrition Survey Decmber2014

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(iv) Acronyms:

DRC	Danish Refugee Council
CD	Central Darfur State
CI	Confidence Interval
CMAM	Community-based Management of Acute Malnutrition
ENA	Emergency Nutrition Assessment
EPI	Expanded Program of Immunization
FBPMAM	Food Based Prevention of Moderate Acute Malnutrition
FMOH	Federal Ministry of Health
GAM	Global Acute Malnutrition
HAZ	Height for Age Z-score
HH	Households
IBSFP	Integrated Blanket Supplementary Feeding Program
IR	Islamic Relief
IYCF	Infant and Young Children Feeding
JM	Jabel Marra
KAP	Knowledge, Attitude and Practices
MAM	Moderate Acute Malnutrition
MUAC	Mid Upper Arm Circumference
NGO	Non-Governmental Organization
OTP	Outpatient Therapeutic Program
PHCC	Primary Health Care Centre
PHCU	Primary Health Care Unit
SAM	Severe Acute Malnutrition
SC	Stabilization Centre
SMOH	State Ministry of Health
SMART	Standardized Monitoring and Assessment of Relief and Transition
TF	Tearfund
TSFP	Targeted Supplementary Feeding Program
UNICEF	United Nations Children's Fund
WFP	World Food Program
WHO	World Health Organization
WHZ	Weight for Height in Z-score
WAZ	Weight for Age in Z-score
WJM	West Jabel Marra Locality

1. Executive summery

The integrated nutrition and retrospective mortality survey was carried out by Tearfund in West JM Locality, Central Darfur State in collaboration with CD SMOH. The result of this survey will consider as assessment of Tearfund nutrition program in Nertiti IDPs camps and the program catchment area in Tour, Gurni and Nertiti town.

Objectives

The key objective of the survey was to assess nutritional status and mortality rate amongst children aged 6-59 months in Nutrition program catchment area, providing timely and reliable data in a standardized way, understanding the magnitude and severity of malnutrition, by quantifying the acute malnutrition and mortality in WJM which can help to prioritizing humanitarian assistance for program and policy decisions.

Results

Table 1: *Key anthropometric and death results*

Index	**Indicators**		**Result**
Anthropometry			
WHO 2006 Standards	WHZ	GAM ZS <-2 and /or oedema	141) 14.7 % (12.4 - 17.5 95% C.I.)
		Severe Acute Malnutrition W/H <-3 z and /or Oedema	(31) 3.2 % (2.3 - 4.5 95% C.I.)
	HAZ	Stunting	395) 41.4 % (37.2 - 45.9
	WAZ	Underweight	(215) 23.0 % (20.1 - 26.2 95% C.I.)
CMR (deaths/10,000 people / day)			0.59 (0.29-1.22) (95% C.I)
U5MR (deaths in children under five/10,000 children under five/day)			1.71 (0.61-4.68) (95% C.I)*

The prevalence of oedema is 2.3 %

The survey in WJM has highlighted a GAM rate of 14.7% and SAM rate 3.2%, 2.3% ,SAM rat decreased to 3.2% from the previous 2013 survey, where SAM was found to be 6%. But SAM rate still within the red light of emergency according to WHO 2006 emergency threshold in JMD. combined with high frequency of illness among children as confirmed by the 2 weeks retrospective morbidity of 35% of the studied children of 6-59 of age, were got sick within 2 weeks prior to survey date. Main complaints reported were respiratory infection (40.46%), diarrhoea (36.64%) and Malaria/Fever (13.35%). this reflects the low resistance of children physical infrastructure to the mentioned disease due to lack of food.

As the impact of the human nature and local culture more than 92 % of the children from 0-23 age are usually breastfed in WJM, 89.18% initiated breastfeeding in the first hour after delivery. But the main problems are related to exclusive breastfeeding (26.87%), complementary feeding, food variety and early weaning. also the local culture has deep impact on caretaker's practice; epically when the woman discovered that she got pregnant she will automatically stopped breastfeeding even if the child was less than 12 month age. They believe that the pregnant breast milk is harmful during pregnancy period, and they identified it as one of the causes of diarrhoea for children.

The result reflects the improvement of related water sanitation and hygiene practice, 99.22% of HH have access to protected water resources, however, 75% of surveyed clusters were in IDPs camp where Tearfund has wash activities. the average of water consumption 86L/HH/day, the average of HH size was found to be 6 person per HH , that means there is 14L/person/day, the average consumption of water in emergency should be 15L/person/day. Many households (13%) have latrines in their houses, 84% are using communal, and that was due to the fact of the infrastructures of IDPs camps were not appropriately designed (average area of 8m² for a HH) but still there are 3% of HH are using unimproved facilities, including undesignated open area

Recommendation

- Strengthen and scale –up of current nutrition program in Nertiti IDPs camps by training more health workers and increasing number of OTP, TSFP and FBPMAM for better coverage.
- Integration of Wash activities and nutrition service.
- Strengthening the community participation and mal engagement in CMAM program.
- Improve facilities on water and sanitation through multi sectorial program implementation approach.
- To develop a strong behavioral change communication program through community health workers to promote proper hygiene and sanitation practices.
- To develop a strong awareness raising program to improve Infants and Young Children Feeding Practices.

2. Background

WJM has very few developed infrastructures in terms of health and nutrition facilities or economic infrastructures. Few international humanitarian organizations are currently operating in WJM. Those are Tearfund, DRC and IR, with focus of intervention on nutrition, strengthening primary health care, food distribution, livelihood, wash and Emergency response. 3localities situated in Jabel Mara, East Jabel Mara, Central Jabel Mara and West Jabel, due to conflict in Darfur since 2003 people displaced from upper Jabel Mara to Nertiti and Guildo, Tearfund is the only INGO providing the nutrition services to those area since the termination of INGOs by GOS in 2009, currently Tearfund nutrition program catchment areas covering two localities, in Jabel Mara (West& Central),but the program beneficiaries are coming from all Jabel Mara (3 localities, East, west and Central Jabel Mara). The nutritional situation of the population living affected by instability of security situation as the result of military skirmishes between GOS and SLA, and as the result of the lack of health and nutrition service in that area.

the prevalence of Global Acute Malnutrition is high in the presence of aggravating factors e.g. deficiency of food (quality and quantity), continued household food insecurity due to a poor harvest season and security situation, lack of primary health care PHC, , increased food prices and high disease burden.

3. Introduction

3.1. Geography and population Jabel Mara

The inaccessibility to Jabel Mara area in Central Darfur due to frequent clashes it has resulted displacements and increased vulnerability of the affected population in the area to high levels of food insecurity, disease and malnutrition. There are no recent nutrition surveys in that area, however according to June 2013 localized surveys conducted in Nertiti – West Jabel Mara locality reported global acute malnutrition of 19%, also the S3M reported 8.6% GAM, the 2surveys conducted, during the same period with different results. Poor child feeding practices due to displacement, poor hygienic/ sanitation environment were most displaced and limited access to health facilities and limited access to the water in addition to the unprotected sources of drinking water, all those increased the vulnerability among the community.

The total population is estimated to 20768 p * mainly agrarian and nomads, and most of them are from two tribes Fur and Arab. Geographically this survey covered West Jabel Mara locality. This assessment conducted in collaboration with CD State Ministry of Health SMOH, UNICEF and Sudanese Red Crescent SRC.

3.2. Justification to conduct the survey:

Tearfund carried out two nutrition surveys in west Jabel Mara locality (Nertiti) base line in December 2012 and monitoring survey on June 2013 both nutrition surveys show high malnutrition rates as below table:

Table 2: *Nertiti SMART Surveys in last 3years*

* EPI CD Targeted population 2014

Month	GAM	SAM
December 2012	**15.0 % (12.4 - 18.1 95% CI)**	3.7 % (2.5 - 5.3 95% C.I.)
June 2013	*19.0% (15.7-22.7 95% CI)*	*6.0% (3.5-10.2 95% CI*

As the result of those surveys, Tearfund implemented OTP/SFP in 9 project sites and a pilot Integrated Blanket Supplementary Program IBSFP at Thur Village; besides supporting the Stabilization Centre SC in Nertiti Hospital since 2012 up to Now. All the components are being implemented in collaboration with State Ministry of Health and Sudanese Red Crescent SRC.

As part of the programming, there was need to update the information on current nutritional status of WJM. The result of these surveys will be used as assessment data /benchmark for program intervention in WJM, Additionally, based on the result of the survey, Tearfund will adapt its program to respond to the need of the beneficiaries, and this will assess impact on ongoing interventions in WJM. The survey is specifically to assess and monitor nutritional status in WJM and the findings of the standard nutrition survey will be used to understand the overall nutrition, food security and health status across the area and give recommendations for planning and decision making.

3.3 The objectives:

The key objective of the survey was to assess nutritional status and mortality rate amongst children aged 6-59 months in WJM, providing timely and reliable data in a standardized way, understanding the magnitude and severity of malnutrition, by quantifying the acute malnutrition and mortality in WJM which can help to prioritizing humanitarian assistance for program and policy decisions.

3.4. Specific objectives include:

- Assessing the prevalence of acute malnutrition in children aged 6-59 months.
- Estimating the Crude and under five mortality rates.
- Determine the Infant and Young child feeding practices among children 0 – 23 months.
- Investigate household food security and food consumption patterns.
- To determine the morbidity and health seeking behaviors.
- To estimate immunization and Vitamin A coverage in the both areas.
- Determine the proportion of households with access to safe water.
- To make recommendations for a program intervention strategy.

4. Methodology

4.1 **Sample size and Clusters sampling**

This integrated and retrospective mortality survey was conducted using SMART survey methodology. ENA for SMART software 2011 version was used to calculate the sample size of

anthropometry component, a total of 684 children in 979 households were calculated as representative using the parameters shown in table 3 below., Similarly, for mortality component, 1580 people in 326 households were required to get a representative sample. Since the two components are integrated, the higher household size was taken as the sample size for the survey; therefore, the sample size for the survey was 979 households. Considering 6 teams collecting data in 5 days covering 32 households per day per team, a total of 957 households were covered- slightly higher than the 816 generated by ENA software. Table 3 below indicates the variables used to determine the sample size using ENA for SMART 2011 software.

Table 3: *variables used to determine the sample size using*

Variable	**Value for Anthropometry**	**Value for Mortality**	**Rationale**
Estimated prevalence	19	2	The S3M and local SMART survey were conduct in the same period; this survey used 2013 SMART survey of Nertiti. The result of this survey **in table 2**
Desired precision	4	1	In line with the above Nertiti Survey confidence interval
Design effect	1.7	1.7	Considering population heterogeneity
Average household	6	6	Based on west Darfur Census 2008, and Tearfund KAP survey in Nov2014.
% children under 5 years	16	NA	Based on SMOH recommended proportion of U5s in Sudan
% non-respondent rate	3	3	It is assumed that most of the families wouldn't be away on their farms, as the survey is planned after harvest season
Recall period	NA	90	Based on FMOH SMART Survey Guideline
Number of children to be included	684	NA	Suggested by ENA software
Number of households to be included	816	326	Taking the bigger size, a total of 979 households was targeted for the survey (both for Anthropometry and mortality)
Population to be included	NA	1580	Suggested by ENA software

4.2 Selection households and children:

A two stage cluster sampling method was used for selecting villages and sampled households. The first stage was the assignment of clusters using villages as geographic units. A total of 30 clusters were selected by ENA software with additional 4 villages/clusters identified as reserve clusters. Population at village level was projected from the data availed by SMOH- EPI which was the result of house-to-house polio and acceleration campaign conducted in 2014.

The geographical centre of the village was found with a community member help, from the centre of the village a direction was determined by spinning a pen into the air. The team followed the direction of the pen until the boundary of the village. From that point the pen was spun again, and the team walked in that new direction counting the number of houses passed on the right and left by marking houses with a chalk till the end of the village. The number of houses marked was written on pieces of paper from 1 to the final number with one number per piece. The pieces of paper were put in a bag and shaken, and a child was let to pick out one piece. The selected household number was used as the first house to start the survey. Turning to the right and going to the nearest household was continued until the 32 households were visited in the given cluster.

All children between 6-59 months in each selected house were included in the anthropometric assessment. The same household was assessed for mortality, water source, livelihood, and IYCF questionnaire was administered if there are children between 0-23 months within the selected household. When the administrative boundary of the village was reached, the enumerators returned back to the center of the village and repeated all the above steps going in different direction and never assessed the same household twice.

4.3 Case definitions and inclusion criteria

- Household: A household define as consisting of all persons with family or other social relationships among themselves eating from the same cooking pot and sharing a common resource base.

4.3.1 Anthropometric indicators

- **Age**: Immunization cards or birth certificates used as primary source of information, in the absence of these, a local calendar of events was developed from discussions with community members, enumerators and key informants and used to estimate the child age in months.

- Weight: Electronic / hanging scale was used to measure the children's weight during data collection and survey enumerators' training.

- Height: A wooden height board was used to measure height for children above 2 years of age (≥ 87 cm) while length will take for children less than 2 years of age (≤87 cm) with height board lying down.

- MUAC: MUAC was measured using MUAC tape on the left arm at the mid-point of the left upper arm.

- Bilateral oedema: Bilateral pitting oedema was verified by thumb pressure apply on top of both feet for three seconds.

4.3.2 Health and morbidity related indicators:

- Vitamin A supplementation in last 6 months: That was determined by care taker.

- Measles Vaccine coverage: Only children greater than or equal to 9 months was included to determine Measles coverage.

- Morbidity (type of Illness and Treatment sought): This information was collected over a two week recall period prior the survey date, by interviewing the caretaker.

4.4 Questionnaire

Nutrition, health and mortality questionnaire was administered to all selected households and anthropometric measurements for households with children 6 –59 months. IYCF questionnaire was administered to households that have children aged 0-23 months.

4.5 Training - Survey teams and supervision

6 teams of two enumerators and one team leader each in addition to 4 supervisors were trained from 25-27 December 2014 by the survey consultant, (SMOH nutrition manager). This was covered description of objectives and methodology, anthropometric measurements and mortality assessment, data collection and interview skills. A Standardization test and field pilot test in a village that was not selected for the survey was a part of the training to give opportunity to team members to familiarize with the tools. A close supervision of the data collection and daily feedback was done to ensure good quality of data.

Survey teams during practical training of HHs randomly selection method (WJM December2014)

4.6 Data entry and analysis

Daily data entry was undertaken to ensure quality of data and feedback was given to the teams on daily basis. ENA for SMART 2011 software version was used to enter and analyze anthropometric and mortality data. Anthropometric data with extreme values may be excluded by

the software from the analysis using SMART flags with boundaries for exclusion could defined at +/- 3 SD of WHZ from the observed WHZ mean.

EPIINFO7 Version was used to enter and analyze other data related to health, Morbidity and IYCF components. Data was cleaned, edited and analyzed by Tearfund and SMOH with previous surveys experience.

4.7 Anthropometric indices

Table 4: *Threshold values for weight for height, height for age and weight for age indices according to WHO 2006 reference standards*

Rating of Malnutrition	Acute Malnutrition (WFH)	Chronic Malnutrition (HFA)	Underweight (WFA)
Global	<-2SD and/or bilateral Oedema	<-2SD	<-2SD
Moderate	<-2SD and >3SD and Oedema	<-2SD and >3SD	<-2SD and >3SD
Severe	<-3SD and/or existing bilateral oedema	<-3SD	<-3SD

Table 5: *Threshold values of the anthropometric measurements of MUAC*

MUAC (CMAM&FBPMAM Guideline)	interpretation
MUAC<115mm and/or bilateral Oedema	Severe acute malnutrition(SAM)
MUAC >=115mm and <125mm *(no bilateral oedema)*	Moderate acute malnutrition(MAM)
MUAC >=125mm and <135mm *(no bilateral Oedema)*	At risk of acute malnutrition

3.8 Ethical considerations

The proposal for the survey was previously submitted and approved by the technical working group of the nutrition cluster of Central Darfur State CD, the CD authorities (SMOH and HAC), and the local authorities were officially briefed on the purpose of this assessment.
Concerns of the caretakers of sampled children were respected and information collected was treated as confidential.

5. Result

5.1 Anthropometric results

A total of 957 children aged 6 – 59 months were sampled for the anthropometric component.

5.1.1 Distribution by age and sex

Table 6: *Distribution of age and sex of sample*

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	121	50.4	119	49.6	240	25.1	1.0
18-29	125	53.2	110	46.8	235	24.6	1.1
30-41	96	45.9	113	54.1	209	21.8	0.8
42-53	90	47.4	100	52.6	190	19.9	0.9
54-59	46	55.4	37	44.6	83	8.7	1.2
Total	478	49.9	479	50.1	957	100.0	1.0

Boys and girls equally represented, the overall sex ratio was 1.0 (within expected range of 0.8 to 1.2) indicating the sample selection was not biased.

5.1.2 Anthropometric results (based on WHO standards 2006)

The prevalence of GAM and SAM based on WHZ were, respectively, at 14.7 % and 3.2 % while the Prevalence of MAM 11.5 %. According WHO 2006 standards Global Acute Malnutrition (GAM) is defined as W/H < -2 ZS and/or nutritional oedema while Severe Acute Malnutrition (SAM) is defined as W/H < -3ZS and/or nutritional oedema**.**

Table 7: The prevalence of GAM and SAM based on WHZ

	All **n = 956**	Boys **n = 477**	Girls **n = 479**
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(141) 14.7 % (12.4 - 17.5 95% C.I.)	(76) 15.9 % (12.4 - 20.2 95% C.I.)	(65) 13.6 % (10.7 - 17.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(110) 11.5 % (9.1 - 14.4 95% C.I.)	(60) 12.6 % (9.4 - 16.7 95% C.I.)	(50) 10.4 % (7.6 - 14.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(31) 3.2 % (2.3 - 4.5 95% C.I.)	(16) 3.4 % (2.0 - 5.6 95% C.I.)	(15) 3.1 % (1.9 - 5.1 95% C.I.)

The prevalence of oedema is **2.3%**

The above result indicate that males are more disposed to malnutrition (GAM in Boys 15.9), than females (GAM in Girls13.6), and the prevalence of SAM among boys is slightly higher the prevalence of SAM among girls.

5.1.3 Distribution acute malnutrition defined in WFH in Z-score and or Oedema by age:

Table 8: *Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema*

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	240	1	0.4	28	11.7	207	86.3	4	1.7
18-29	234	2	0.9	32	13.7	195	83.3	5	2.1
30-41	209	3	1.4	20	9.6	179	85.6	7	3.3
42-53	190	2	1.1	24	12.6	160	84.2	4	2.1
54-59	83	1	1.2	6	7.2	74	89.2	2	2.4
Total	956	9	0.9	110	11.5	815	85.3	22	2.3

Of the 957 children sampled, 1 was excluded from analysis as SMART flags. And there were 22 Oedema cases (2.3%) were found during the survey, and this reflects the rate of protein deficiency in among the children ageU5s daily food in Nertiti.

Table 9: *Distribution of acute malnutrition and oedema based on weight-for-height z-scores*

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 22 (2.3 %)
Oedema absent	Marasmic No. 9 (0.9 %)	Not severely malnourished No. 925 (96.8 %)

The result showed a significant Oedema rate, in the studied area, 22 cases were found. However 18 of 22 were registered before for treatment in nutrition program.

Table 10*: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex*

	All n = 957	**Boys** n = 478	**Girls** n = 479
Prevalence of global malnutrition (< 125 mm and/or oedema)	(133) 13.9 % (10.9 - 17.5 95% C.I.)	(61) 12.8 % (9.5 - 16.9 95% C.I.)	(72) 15.0 % (11.2 - 19.9 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(95) 9.9 % (7.1 - 13.7 95% C.I.)	(43) 9.0 % (6.1 - 13.2 95% C.I.)	(52) 10.9 % (7.3 - 15.8 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(38) 4.0 % (2.6 - 5.9 95% C.I.)	(18) 3.8 % (2.2 - 6.3 95% C.I.)	(20) 4.2 % (2.6 - 6.7 95% C.I.)

The prevalence of GAM rate based on MUAC less than emergency threshold (>15%), but SAM rate exceeded the emergency threshold (3%). Compared to the 2013 survey SAM rate declined to 3.2% instead of 6%.

Table 11: *Prevalence of underweight based on weight-for-age z-scores by sex*

	All n = 934	Boys n = 467	Girls n = 467
Prevalence of underweight (<-2 z-score)	(215) 23.0 % (20.1 - 26.2 95% C.I.)	(128) 27.4 % (22.5 - 32.9 95% C.I.)	(87) 18.6 % (15.1 - 22.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(192) 20.6 % (17.7 - 23.8 95% C.I.)	(115) 24.6 % (20.3 - 29.6 95% C.I.)	(77) 16.5 % (13.2 - 20.4 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(23) 2.5 % (1.6 - 3.9 95% C.I.)	(13) 2.8 % (1.5 - 5.2 95% C.I.)	(10) 2.1 % (1.1 - 4.0 95% C.I.)

The result evident that there is deferent based on sex in underweight.

Table 12*: Prevalence of underweight by age, based on weight-for-age z-scores*

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	235	4	1.7	35	14.9	196	83.4	4	1.7
18-29	230	15	6.5	51	22.2	164	71.3	5	2.2
30-41	202	3	1.5	50	24.8	149	73.8	7	3.5
42-53	186	1	0.5	41	22.0	144	77.4	4	2.2
54-59	81	0	0.0	15	18.5	66	81.5	2	2.5
Total	934	23	2.5	192	20.6	719	77.0	22	2.4

According to the findings the prevalence of severe underweight among the children 18-29 group of age is higher than other groups.

Table 13: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 953	Boys n = 476	Girls n = 477
Prevalence of stunting	(395) 41.4 %	(216) 45.4 %	(179) 37.5 %

(<-2 z-score)	(37.2 - 45.9 95% C.I.)	(40.4 - 50.5 95% C.I.)	(31.5 - 43.9 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(267) 28.0 % (24.5 - 31.8 95% C.I.)	(146) 30.7 % (26.3 - 35.4 95% C.I.)	(121) 25.4 % (21.0 - 30.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(128) 13.4 % (10.3 - 17.3 95% C.I.)	(70) 14.7 % (10.8 - 19.8 95% C.I.)	(58) 12.2 % (8.5 - 17.2 95% C.I.)

Though the number of stunted boys was higher than girls, statistics test using Chi 2 showed there was no statistical relation between the sex and Height for Age in this sample (with p >0.648).

Table 14: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	236	21	8.9	55	23.3	160	67.8
18-29	235	47	20.0	72	30.6	116	49.4
30-41	209	34	16.3	69	33.0	106	50.7
42-53	190	20	10.5	52	27.4	118	62.1
54-59	83	6	7.2	19	22.9	58	69.9
Total	953	128	13.4	267	28.0	558	58.6

Table 15: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	934	-0.52±1.17	1.43	22	1
Weight-for-Age	934	-1.30±0.92	1.15	22	1
Height-for-Age	953	-1.70±1.15	1.76	0	4

Contains for WHZ and WAZ the children with oedema

5.2: Mortality results

A recall period of 90 days was used to collect retrospective mortality data.

5.2.1: Households status

Table 16: *Demographic Data for Crude and Under five Mortality*

Demographic data	Number
Current residents at house hold level	5634
Current under five residents at household	1301
People who joined the household	1061
Under five who joined the household	143
People who left the household during recall period	802
Under five children who left house hold during recall period	115
Birth	44
Total deaths	33
Under five death	16
CMR (deaths/10,000 people / day)	0.59 (0.29-1.22) (95% C.I)
U5MR (deaths in children under five/10,000 children under five/day)	1.71 (0.61-4.68) (95% C.I)*

The above death rates remain below emergency cut-off points of 2/10,000/day for CMR and 2/10,000/day for U5MR.

5.3: Coverage of Keys Health Indicators

The result reflect significant deficiency of micronutrient, measles and Vitamin A coverage, moreover 64% of the studied children got ill within the recall period (2weeks).

5.3.1 Measles Coverage

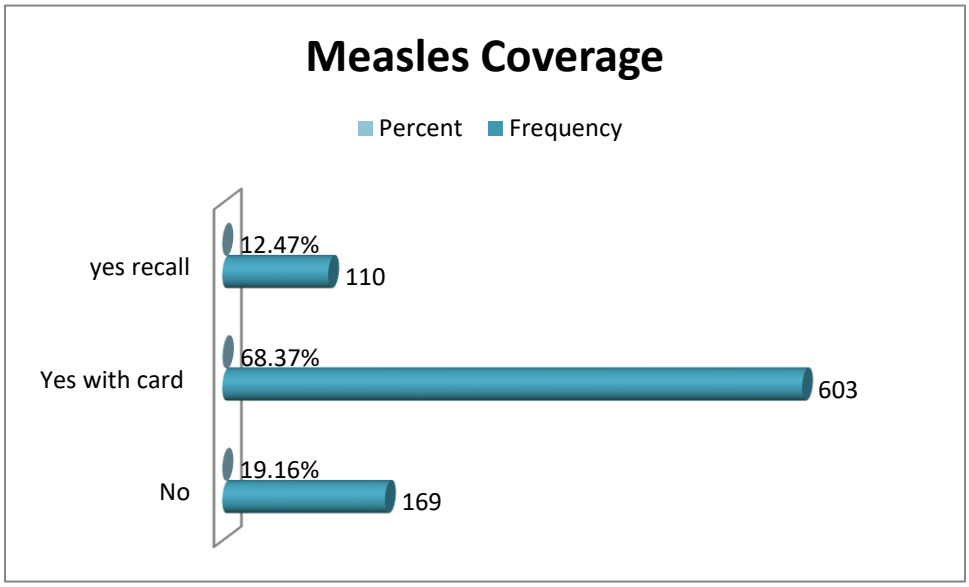

Figure 3: *Measles coverage*

80.84% of children 9-59 months were reported immunized (68.37% with EPI card). Measles coverage rate in WJM exceeded slightly the WHO recommended coverage rate (80%).

5.3.2 Vitamin A supplementation in last six months

High rate of Vitamin A supplementation were found, however, 93.83% of the children received within the last six months. And also the results reflect the improvement of Vitamin A coverage in IDPs camp in Nertiti, compared to the 2013 survey result.

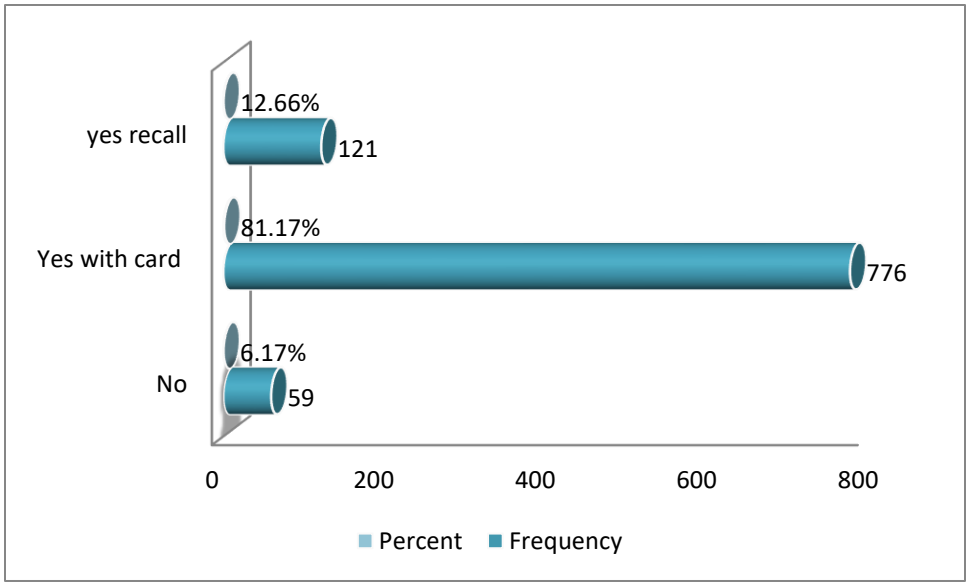

Figure 4: Vitamin A supplementation

5.3.3 Illness in past 2 weeks

35% of the studied children of 6-59 of age were got sick within 2 weeks prior to survey date. Main complaints reported were respiratory infection (40.46%), diarrhoea (36.64%) and Malaria/Fever (13.35%).

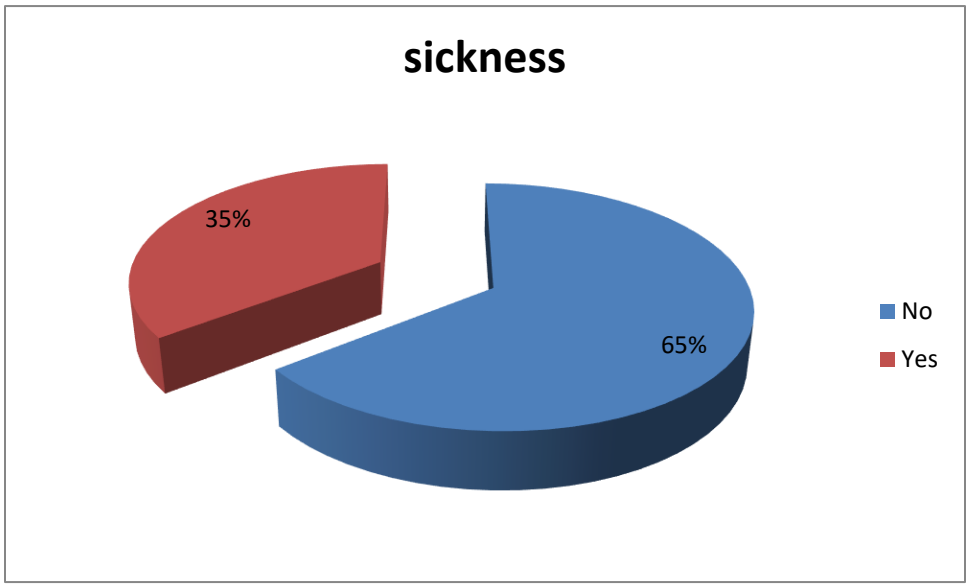

Figure 4*: Illness in past 2 weeks*

5.3.4 Children U5s admitted to nutrition program

9% of the surveyed children were registered in one of CMAM component (SFP, OTP and SC), that indicate the significant of nutrition status among under five of age in WJM.

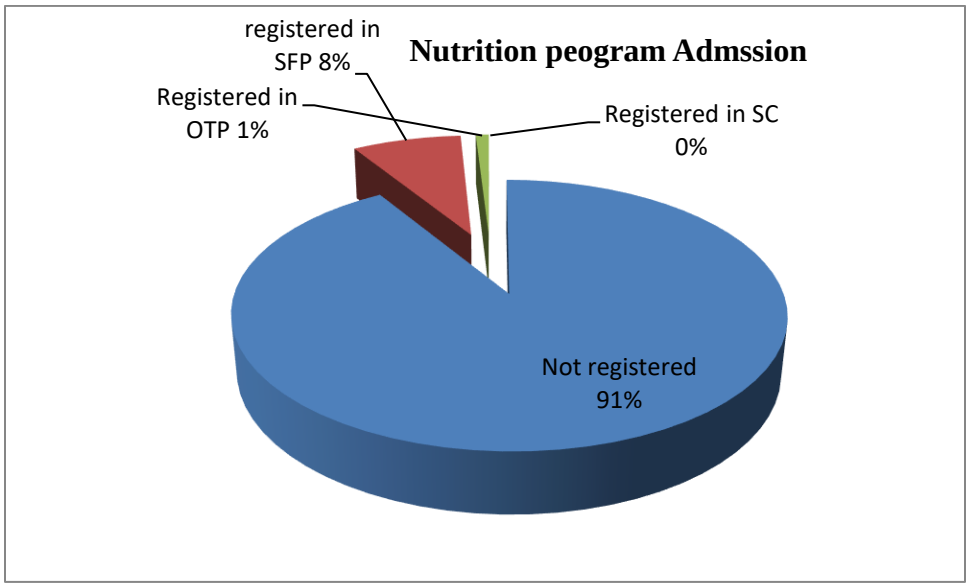

Figure 5*: Nutrition program Admission*

5.4 IYCF Results

As the impact of the human nature and local culture more than 92 % of the children from 0-23 age are usually breastfed in WJM, 89.18% initiated breastfeeding in the first hour after delivery. But the main problems are related to exclusive breastfeeding (26.87%), complementary feeding, food variety and early weaning. also the local culture has deep impact on caretaker's practice; epically when the woman discovered that she got pregnant she will automatically stopped breastfeeding even if the child was less than 12 month age. They believe that the pregnant breast milk is harmful during pregnancy period, and they identified it as one of the causes of diarrhoea for children.

For the current complementary feeding practice, the children were usually fed from family meals; only 28% of caretakers was devoting food for their children .

5.4.1 Child ever breastfed

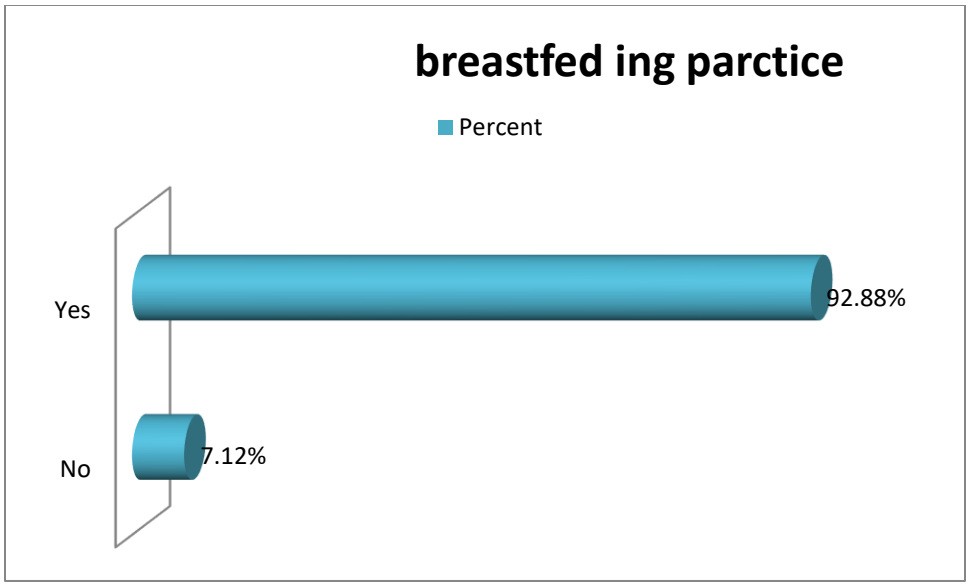

***Figure 6**: Breastfeeding practices*

5.4.2 Early initiation of breastfeeding

Of the 379 children born in the last 24 months that were breastfed, high proportion 388 (89.18%) was put to breast immediately in the first hour after delivery.

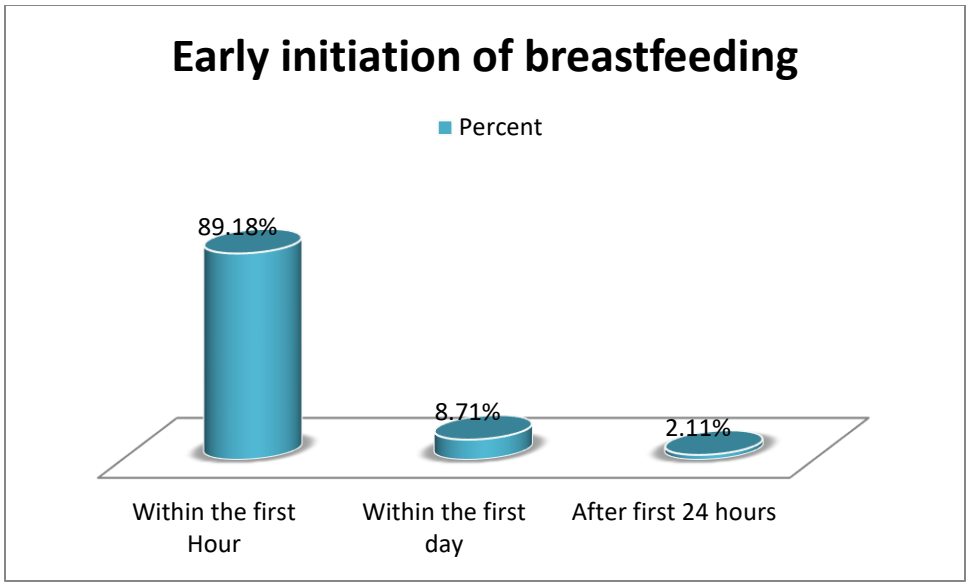

Figure 7: *initiation of breast feeding*

5.4.4 Exclusive breastfeeding under 6 months

The findings indicated the lack of exclusively breastfeeding among the children 0-6 month of age, only 26.87%, likewise the breast feeding practice affected by local culture among the community

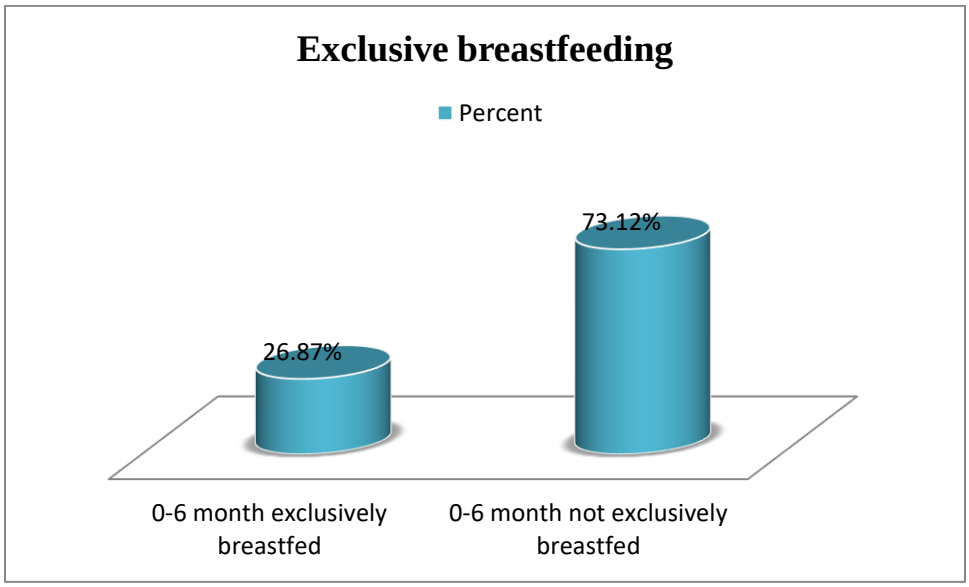

Figure 7: *exclusive breast feeding*

5.4.5 Minimum meal frequency

27% of breastfed and non-breast fed children aged 6-23 months do not received food during last 24hours, and 7% received 1 meal, in admission to 9 % were received 2 meal per day, this indicate that 43% of children under five of age received inadequate food , and 57%% are received more 3 or more meals a day See figure 11. For this age group meal includes solid, semi-solid, or soft foods (but also milk feeds for non-breastfed children.

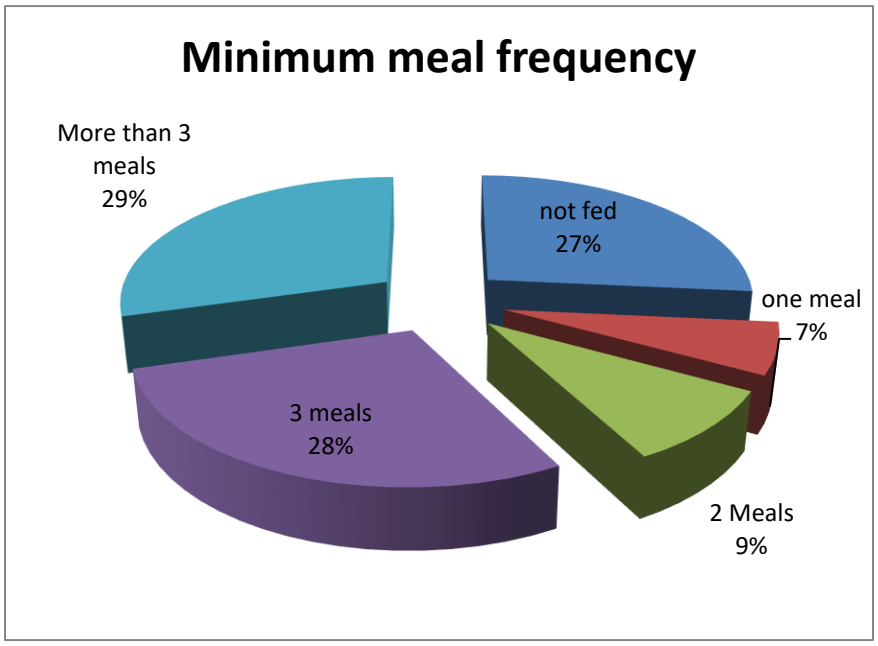

Figure: 9 Meals frequency

5.5: HH info in WJM

The average of HH size 6 person per HH, and majority of them headed by male (86.07%), while there are 13.18% of HH in headed by female, with average of 1 children U5 of age per HH. but women contributed by more than 60% in HH expense. 72.22% of studied HH were cultivate in this year, while 27.77% were not able to cultivate most of them are IDPs.

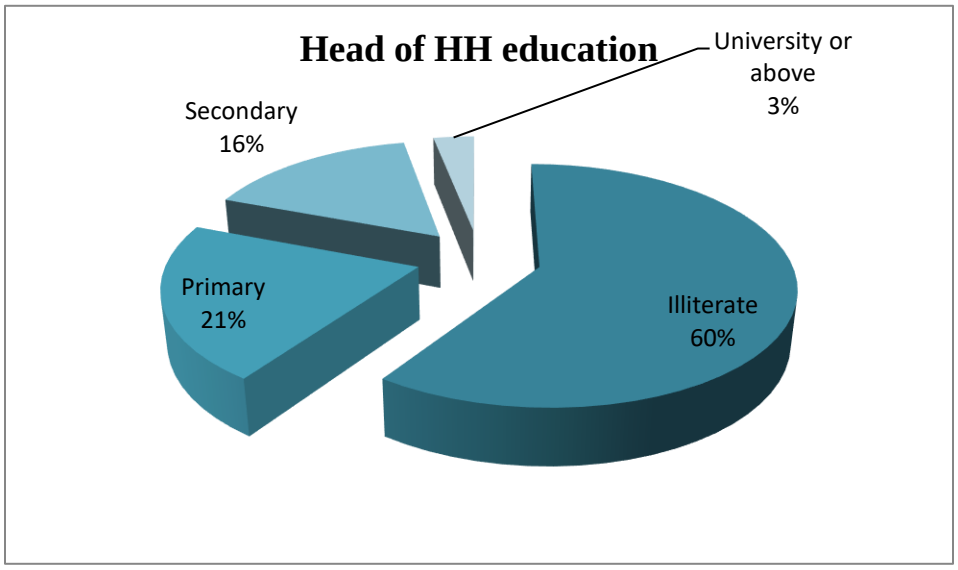

Figure 10: ***Head of HH education level***

5.5: WASH results

The result reflects the improvement of related to water sanitation and hygiene practice, 99.22% of HH are access to protected water resources, however, 75% of survived cluster were in IDPs camp where Tearfund has wash activities. the average of water consumption 86L/HH/day, the average of HH was found 6P, that means there is 14L/person/day, the average consumption of water in emergency should be 15L/person/day.

5.5.1: water source

The ongoing Tearfund WASH activities in Nertiti IDPs camp, IR WASH activities in WJM villages, had positive impact on improvement of water sanitation in WJM. However 99.22 of respondents HH have access and using water from protected water source, 95.50% from hand bumps and 3.72% from protected wells.

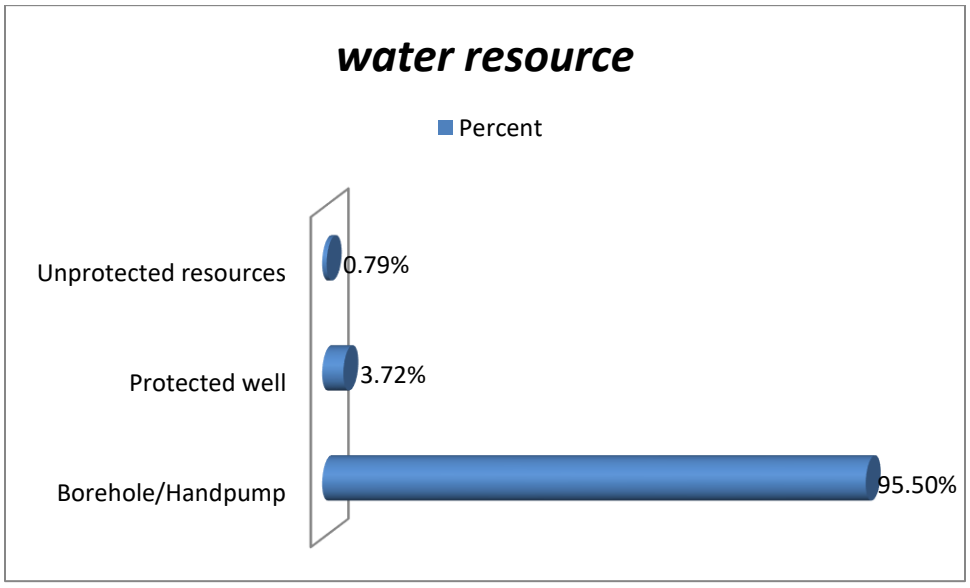

Figure 11: *HH water resource*

In addition to the water treatment effort by encourage local community to treat the water before using, by chlorine or other means of water treatment.

5.5.2: Use of sanitary facilities

The majority of the households (13%) have latrines in their houses, 84% are using communal, and that was due to the fact the IDPs camps were not appropriately designed (average area of 8m² for a HH) but still there are 3% of HH are using unimproved facilities, including undesignated open area.

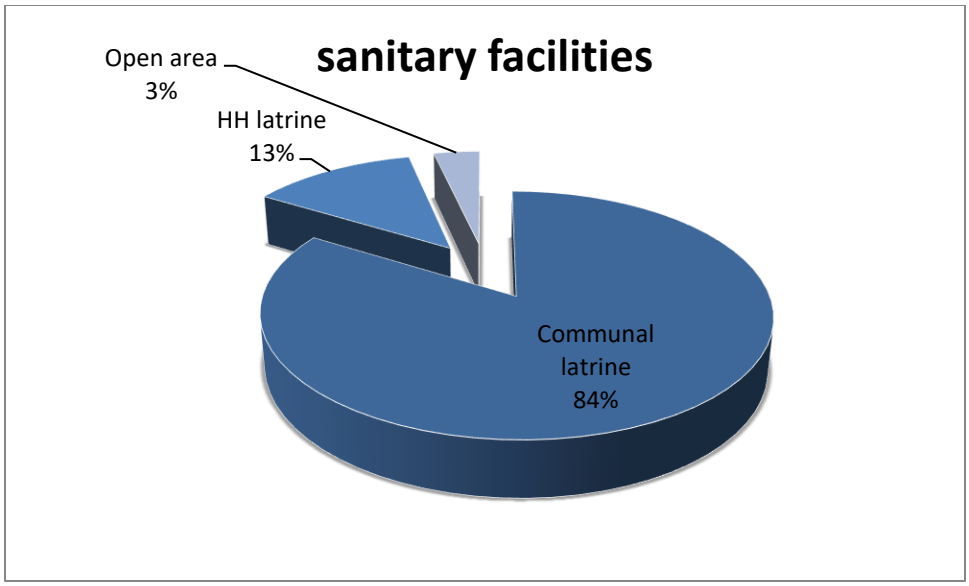

Figure 12: sanitary facilities

5.6: Household food security

People in WJM depends in their livelihoods on cultivation and herding, most of them are farmers (95%) and 5% are herders. The main agricultural crops are Millet (48%), Maize (16%), and 1% of Okra and 2% for the other corps Groundnuts and sesame. and most of their production for Most for domestic consumption. (See figure12)

5.6.1: Crops

Carbohydrates at the forefront of the corps in WJM (48% millet), and it is the stable food for the residents. But there were 28% of studied HH were not cultivate in this year.

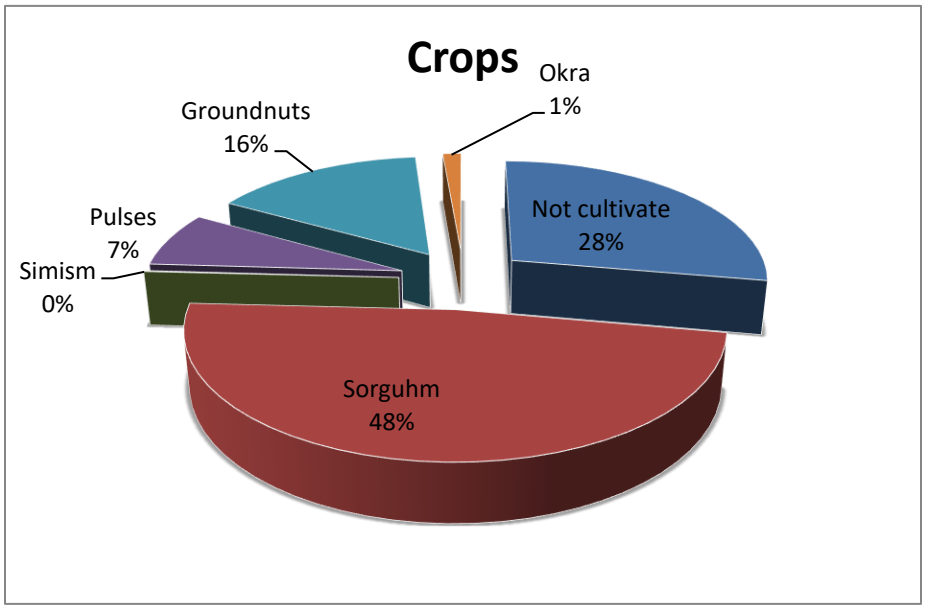

Figure 12**: Crops**

5.6.2: The micronutrients consumption

The result showed the deficiency of micronutrient among the vulnerable groups, children U5s age, Pregnant and Lactating Women PLW, as the result of the lack of seeking for PHC service culture among the WJM community.

5.6.3.1: Vitamin A after delivery of last child

40% women received Vitamin A after delivery, with the fact of deficiency of animal protein in family daily food, this generally has deep impact on the community health and nutritional status, and particularly on the vulnerable group's health and nourishment.59% do not received.

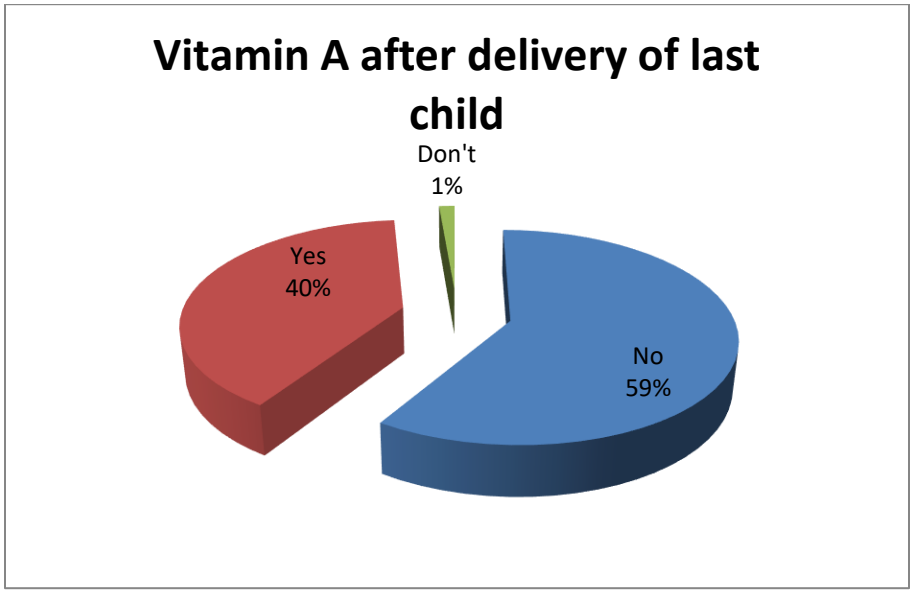

Figure 13: Vitamin A after delivery of last child

5.6.3.2: Iodine consumption

The majority of HH in WJM (66%), found using Iodized salt, and 18% heard about it before but they are not using. And still there are 16% of HH know nothing about iodised salt.

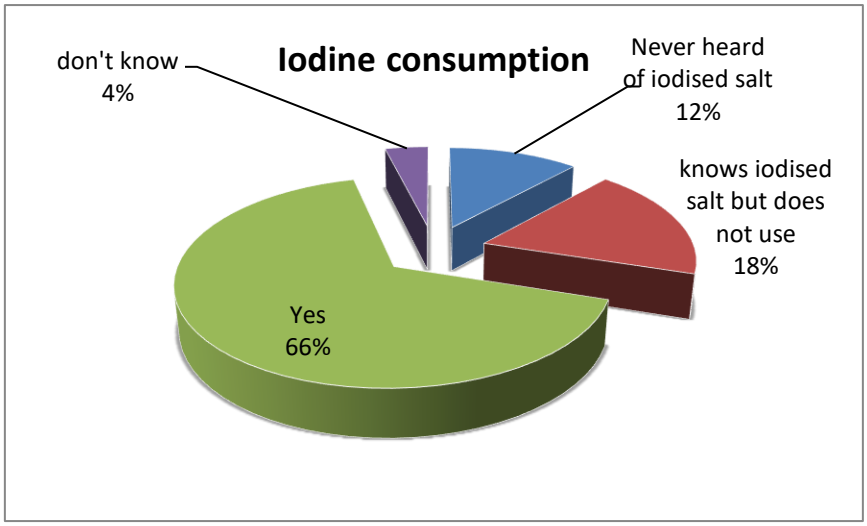

Figure14: *Iodine consumption*

5.6.3.3: Iron with Folic acid BP capsules (Fierofol SR) consumption during the last pregnancy

59% of respondent are dealing with Fierofol SR during pregnancy, but there are 41% did not take, thus the mothers and children will be exposed to the risk of anaemia as the result of deficiency of iron in their body.. (See figur15).

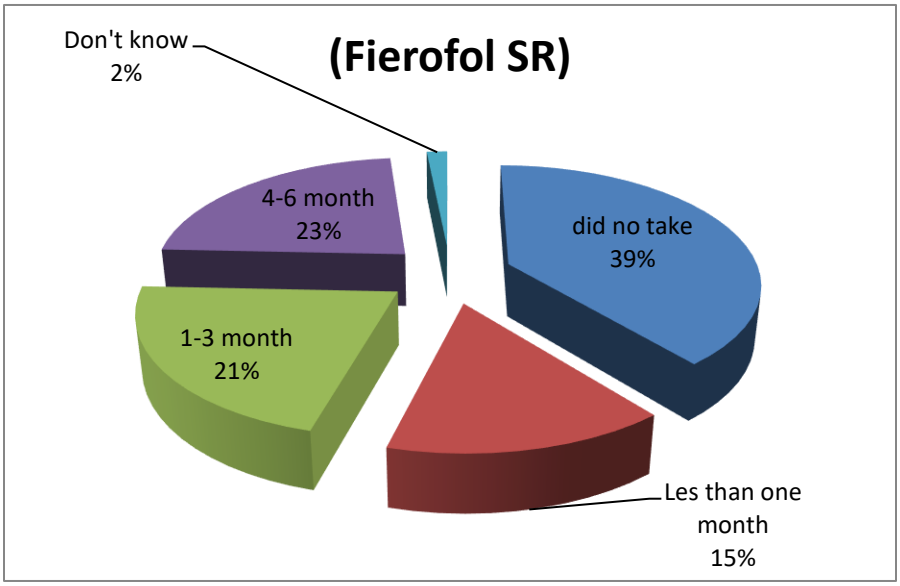

Figure 15: *Iron caps (Fierofol) consumption*

5.6.3.4: Family meals

The average of family meals in Jabal Marra is 3 meals per day, 82% of the HH are eating 3 and meals per day, the children U5s of age, PLW and the rest of family members all are sharing the same pot and number of meals, so that evident the deterioration of nutrition status among the community as result of lack of food (quality and quantity).see figure16.

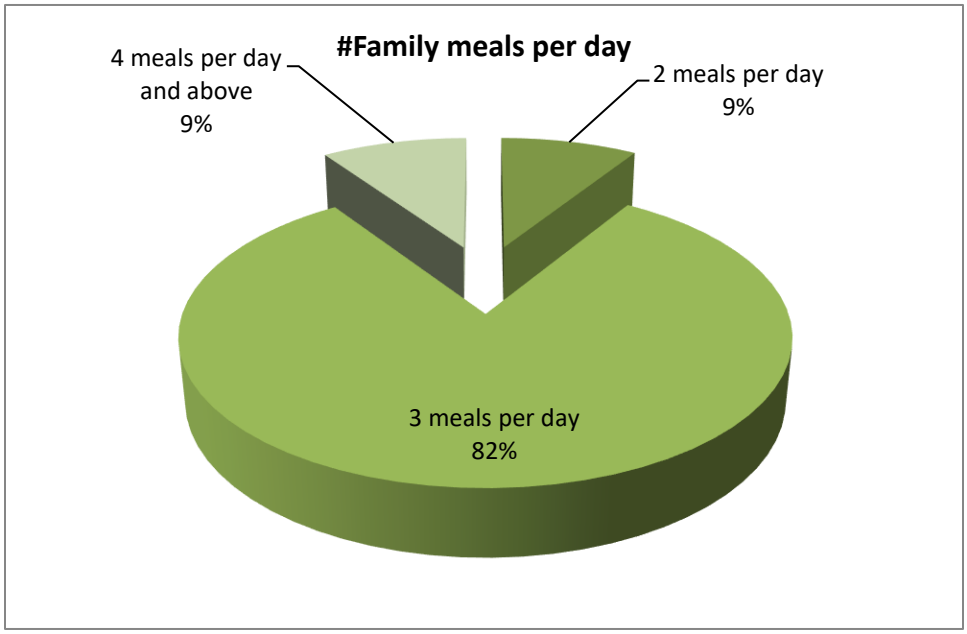

Figure 16: Family meals

6. Discussion and Analysis

- Nutritional status

According WHO, malnutrition is responsible, directly or indirectly, for 53% of deaths among children under5s of age. Medical and socio economic conditions play a key role as underlying causes contributing to malnutrition.

The survey in WJM has highlighted a GAM rate of 14.7% and SAM rate 3.2%, 2.3% were Oedema cases, heaver GAM rate is declined compared to the previous SMART survey, where it was 19%. Also SAM rat decreased to 3.2% from the previous 2013 survey, where SAM was found to be 6%. But SAM rate still within the red light of emergency according to WHO 2006 emergency threshold in JMD.

The prevalence of Oedema (2.3%), indicate the deficiency of protein among children under five of age in WJM.

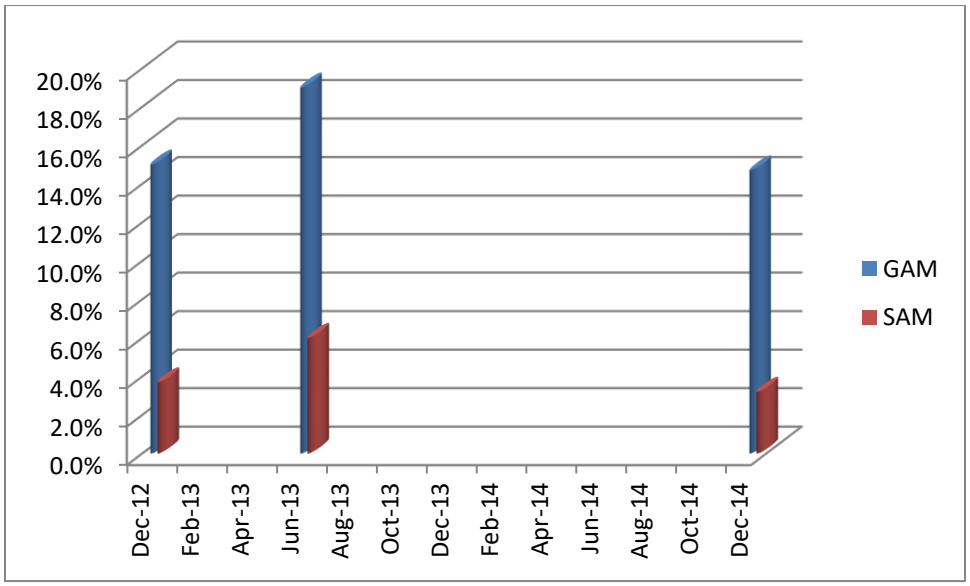

Figure 15: Current Survey result GAM rate compare to S3M 2012& 2013 survey GAM rate

- High prevalence of MAM (11.5%) combined with high frequency of illness among children as confirmed by the 2 weeks retrospective morbidity of 35% of the studied children of 6-59 of age, were got sick within 2 weeks prior to survey date. Main complaints reported were respiratory infection (40.46%), diarrhoea (36.64%) and Malaria/Fever (13.35%). this reflects the low resistance of children physical infrastructure to the mentioned disease due to lack of food.

- Expected number of children in Global Acute Malnutrition in WJM

Population	%U5s	MAM	SAM	GAM
79922	16%	2927	815	3742

- **Death rates**

Both crude mortality rate and under-five mortality rate were below the WHO alert cut-off in WJM. The health and nutrition status improved in WJMT his was due to the increasing of health and nutrition awareness in the community, as the result of the effectiveness of Tearfund wash and nutrition program in WJM.

- **Coverage of Keys Health Indicators**

The result reflects an improvement in micro nutrient consumption in the community capered to 2013 survey results, as well as measles and vitamin A coverage.

Measles coverage rate in WJM exceeded slightly the WHO recommended coverage rate (80%).80.84% of children 9-59 months were reported immunized (68.37% with EPI card).

High rate of Vitamin A supplementation were found, however, 93.83% of the children received within the last six months. And also the results reflect the improvement of Vitamin A coverage in IDPs camp in Nertiti, compared to the 2013 survey result

- **IYCF results**

As the impact of the human nature and local culture more than 92 % of the children from 0-23 age are usually breastfed in WJM, 89.18% initiated breastfeeding in the first hour after delivery. But the main problems are related to exclusive breastfeeding (26.87%), complementary feeding, food variety and early weaning. also the local culture has deep impact on caretaker's practice; epically when the woman discovered that she got pregnant she will automatically stopped breastfeeding even if the child was less than 12 month age. They believe that the pregnant breast milk is harmful during pregnancy period, and they identified it as one of the causes of diarrhoea for children.

For the current complementary feeding practice, the children were usually fed from family meals; only 28% of caretakers was devoting food for their children .

- **WASH**

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- **Family food security**

The average of HH size 6 person per HH, and majority of them headed by male (86.07%), while there are 13.18% of HH in headed by female, with average of 1 children U5 of age per HH. but women contributed by more than 60% in HH expense. 72.22% of studied HH were cultivate in this year, while 27.77% were not able to cultivate most of them are IDPs

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7. Recommendation

- Strengthen and scale –up of current nutrition program in Nertiti IDPs camps , training more health workers and increasing number of OTP, TSFP and FBPMAM for better coverage.
- Integration of Wash activities and nutrition service.
- Strengthening the community participation and male engagement in CMAM program.
- Improve facilities on water and sanitation through multi sectorial program implementation approach.
- To develop a strong behavioral change communication program through community health workers to promote proper hygiene and sanitation practices.
- To develop a strong awareness raising program to improve Infants and Young Children Feeding Practices.

Annex 1: Plausibility check for: Nertiti Dec14 SMART data.as

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (0.1 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.974)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**2** (p=0.094)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (5)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**6** (1.17)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.03)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.56)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**5** (p=0.000)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**13** %

At the moment the overall score of this survey is 13 %, this is acceptable.

There were no duplicate entries detected.