

## Assessment of Nutritional Status of Children Under-five Years in Migori County, Kenya

Agatha Christine Onyango\* and Wycliffe Obade

Department of Nutrition and Health, Maseno University, Kenya

\*Corresponding Author: Agatha Christine Onyango, Lecturer, Department of Nutrition and Health, Maseno University, Kenya.

Received: September 05, 2017; Published: October 09, 2017

### Abstract

The objective of the study was to contribute to the reduction in the number of under-five (< 5 years) children who are stunted in Migori County by creating good governance mechanisms and fostering an integrated approach towards optimal nutrition. This was conducted in Migori County, Nyatike Sub-County in 15 community units namely: Kiranda, Obondi, Gunga, Lwanda, Rabuor, Kopala, Odendo, Sori, Wachara, Sidika, Bondo Kosiemo, Alendo, Otati, Aringo all in Karungu Division. Malnutrition (GAM) for children (0 - 59 months) in Karungu Division is at 9.8% of which 7.4% are considered to be severely wasted. Wasting is more prevalent among the boys (10.7%) compared to girls, (8.9%). By ward, children in Kanyasa ward was established to be more affected by malnutrition at 12.9% compared to 8.2% of children in Kachieng' ward. The rate of underweight children in Karungu Division is at 9.6% with the boys (11.4%) more affected compared to girls (7.9%). Over a quarter (37.8%) of children below 5 years in Karungu division are stunted. Of the children who were stunted, 12.3% were moderately stunted and 25.5% severely stunted. Analysis of stunting by sex of the child reveals that 38.2% of the boys below 5 years in Karungu are stunted compared to 37.5% for girls. The results therefore reveal that stunting in Nyatike is higher than the Kenyan national average of 26%. There is need to promote nutrition intervention programmes both at community and facility levels.

**Keywords:** Stunting; Underweight; Mid Upper Arm Circumference; Malnutrition; Nutritional Status; Global Acute Malnutrition

### Abbreviations

ENA: Emergency Nutrition Assessment; GAM: Global Acute Malnutrition; IYCF: Infant and Young Child Nutrition; KAIS: Kenya Aids Indicator Survey; KDHS: Kenya Demographic Health Survey; KIHBS: Kenya Integrated Household Budget Survey ; MOH: Ministry of Health; MUAC: Mid Upper Arm Circumference; NHSSP: National Health Sector Strategic Plan; PEPFAR: President's Emergency Plan for AIDS Relief; SMART: Standardized Monitoring and Assessment of Relief and Transitions; SPSS: Statistical Package for Social Sciences; UNDP: United Nations Development Programme; WHO: World Health Organization

### Introduction

In Kenya the Global Nutrition Target 1 for 2025 of World Health Assembly stunting prevalence has slightly reduced over 2014 (from 35% to 26% - Demographic Health Survey, 2014), the aggravating factors for malnutrition in all its forms in Migori County remain very real. 65% of Migori population is living under the poverty line; low levels of sanitation coverage, with 33.1% of the local population still practicing open defecation (Kenya County sanitation profiles report 2014); fertility rates among the highest in the Country (5.4 children per woman); low levels of female education among the lowest [1] and high HIV and AIDS prevalence, with an estimated HIV prevalence at 15.1% in the former Nyanza Province, where Migori County is located [2].

**Citation:** Agatha Christine Onyango and Wycliffe Obade. "Assessment of Nutritional Status of Children Under-five Years in Migori County, Kenya". *EC Nutrition* 11.4 (2017): 134-141.

## Materials and Methods

The survey target population were mothers in active reproductive ages (15 - 49 years) with children 6 - 59 months of age in order to determine their nutritional status. In addition, children 0 - 23 months old were targeted to assess infant and young child feeding (IYCF) practices so as to establish their nutritional status. The assessment took place from 9<sup>th</sup> to 23<sup>rd</sup> September 2016. The survey used a two-stage cluster sampling methodology based on proportion to population size to select 15 clusters of 20 - 30 households each from the two survey sites, namely: Kanyasa and Kachieng' Wards of Karungu Division. The clusters were selected from a comprehensive list of geographical units (communities). From the sampled households, 451 women were sampled for interview gave anthropometric measurements of 921 children drawn from Karungu Division. The Emergency Nutrition Assessment (ENA) for Standardized Monitoring and Assessment of Relief and Transitions (SMART) version 2010 was used for the planning, training and for data entry and analysis of anthropometry data. The anthropometry Z-scores were calculated using the WHO 2006 growth references. The rest of the data were entered and analyzed in SPSS version 21.0 for Windows.

The exact age of the child were be recorded in months, based on information gathered from the caregiver and confirmed with information from health, baptismal or birth certificates. A chart for calculation of age in months will be used to enable accurate and fast determination of age. Children were be measured in the nude using a 25 kg hanging spring or Salter scale to the nearest 100g. The recumbent length was taken for children less than 85 cm or less than 2 years of age while those greater or equal to 85 cm or more than 2 years of age will be measured standing up. Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was in a relaxed position and hanging by the body's side. The MUAC was measured to the nearest mm. In the event of a disability the right arm was used or for those who are left-handed, MUAC was taken on the right arm. MUAC measurements were taken for children 6 - 59 months of age and for women in the reproductive age (15 - 45 years of age). Oedema was assessed by the application of normal thumb pressure for at least 3 seconds on both feet at the same time. The presence of a pit or depression on both feet was recorded as oedema present and no pit or depression as oedema absent.

## Results and Discussion

### Demographic Characteristics of the Respondents

Table 1 presents the demographic characteristics of the respondents that consisted of married 451 women respondents whose ages were distributed as 15 - 19 years (8.1), 20 - 24 years (27.1%), 25 - 29 years (29.8%), 30 - 34 years (18.3%), 35 - 39 years (10.5%), 40 - 44 years (2.9%) and 45 - 49 years (3.4%). It is evident that majority (83.2%) of the respondents were young mothers 15 - 34 years who were mainly house wives (37.1%) or were involved in petty/merchant traders (48.7%) with only 8.6% in paid employment and another 5.6% earning income from working in their farms or keeping animals.

Age	No	Percent
15 - 19	36	8.1
20 - 24	121	27.1
25 - 29	133	29.8
30 - 34	82	18.3
35 - 39	47	10.5
40 - 44	13	2.9
45 - 49	15	3.4
Occupation		
House wife	164	37.1
Petty trade	220	48.7
Wage employment	39	8.6
Farming/livestock	28	5.6

**Table 1:** Characteristics of Respondents.

### Distribution of the Sampled Children by Age and Sex

In Karungu Division of Nyatike Sub County, 921 children aged 0 - 59 months were sampled during the baseline. Slightly over half 471 (51.8%) of the surveyed children were girls and 439 (48.2%) were boys. The overall ratio of boys to girls (calculated by dividing the total number of boys with the total number of girls) was 0.9, which was within the recommended range of 0.8 - 1.2, demonstrating unbiased sample. The ratio of boys to girls for some of the age categories were within the normal range except for 18 - 29 and 54 - 59 months (0.6) and 30 - 41 months (1.5) as shown in table 2.

Age (months)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:Girl
6 - 17	116	47.9	126	52.1	242	26.6	0.9
18 - 29	95	39.1	148	60.9	243	26.7	0.6
30 - 41	119	59.5	81	40.5	200	22.0	1.5
42 - 53	92	50.8	89	49.2	181	19.9	1.0
54 - 59	17	38.6	27	61.4	44	4.8	0.6
Total	439	48.2	471	51.8	910	100.0	0.9

**Table 2:** Distribution of the Children in Karungu Division by Age and Sex.

### Prevalence of Malnutrition Weight for Height Z-Scores (WHO Standards 2006)

Children whose weight-for-height were found to be below minus two standard deviations (-2 SD) from the median of the reference population were considered wasted (or thin). Wasting represents the failure to receive adequate nutrition in the period immediately before the survey, and typically is the result of recent illness episodes, especially diarrhoea, or of a rapid deterioration in food supplies [5-7]. Table 3 shows that 9.8% of children in Karungu Division are wasted and 7.4% are severely wasted. Wasting levels in Karungu Division of Nyatike Sub-County are more prevalent among the boys (10.7%) compared to 8.9% for the girls. However the prevalence of malnutrition for both genders is at 9.8% which is below the emergency GAM threshold 15%.

	All n = 900	Boys n = 430	Girls n = 470
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(88) 9.8 % (0.5 - 72.0 95% C.I.)	(46) 10.7 % (6.1 - 18.1 95% C.I.)	(42) 8.9 % (0.0 - 97.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(21) 2.3 % (0.0 - 56.7 95% C.I.)	(18) 4.2 % (0.1 - 62.9 95% C.I.)	(3) 0.6 % (0.0 - 91.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(67) 7.4 % (0.0 - 94.6 95% C.I.)	(28) 6.5 % (0.2 - 66.9 95% C.I.)	(39) 8.3 % (0.0 - 98.9 95% C.I.)

**Table 3:** Prevalence of Malnutrition Weight for Height Z-Scores (WHO Standards 2006).

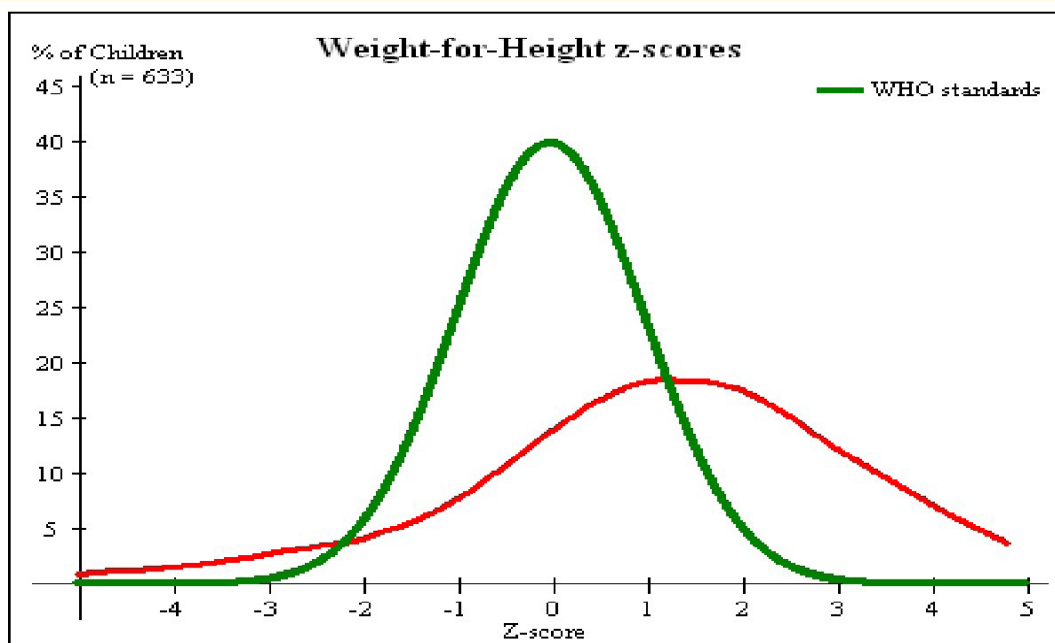
By ward level, children in Kanyasa ward were established to be more affected by malnutrition at 12.9% compared to 8.2% of children in Kachieng' ward as presented in table 4. There were no cases of oedema in both wards.

	Kachieng' Ward n = 633	Kanyasa Ward n = 263	Karungu n = 900
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(52) 8.2 % (6.3 - 10.6 95% C.I.)	(34) 12.9 % (9.4 - 17.5 95% C.I.)	(88) 9.8 % (0.5 - 72.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(18) 2.8 % (1.8 - 4.4 95% C.I.)	(3) 1.1 % (0.4 - 3.3 95% C.I.)	(21) 2.3 % (0.0 - 56.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(34) 5.4 % (3.9 - 7.4 95% C.I.)	(31) 11.8 % (8.4 - 16.2 95% C.I.)	(67) 7.4 % (0.0 - 94.6 95% C.I.)

**Table 4:** Prevalence of Malnutrition Weight for Height Z-Scores (WHO Standards 2006).

**Weight for Height Z-Score Distribution Based on WHO Standards 2006**

The baseline further assessed the prevalence of severe acute malnutrition by ward and established that 5.4% (boys 5.4% and girls 5.4%) of the children within Kachieng' ward were established to be severely malnourished. The sample curve shows a marked displacement below the reference population. This is an indication of poor nutrition of the sampled population in comparison to the reference population [1]. The standard deviation of this sample was 0.9 (which lies within the acceptable range 0.8 - 1.2) indicating that the representativeness of the sample as shown in figure 1.



**Figure 1:** Kachieng' Ward Weight for Height Z-Scores.

In Kanyasa Ward, 12.6% of the under five children were established to be malnourished. The sample curve shows a marked displacement from the reference curve, indicating poor nutritional status of the sampled population. The WHZ standard deviation of the sampled population was 0.88 (which was within the acceptable levels) as shown in figure 2.

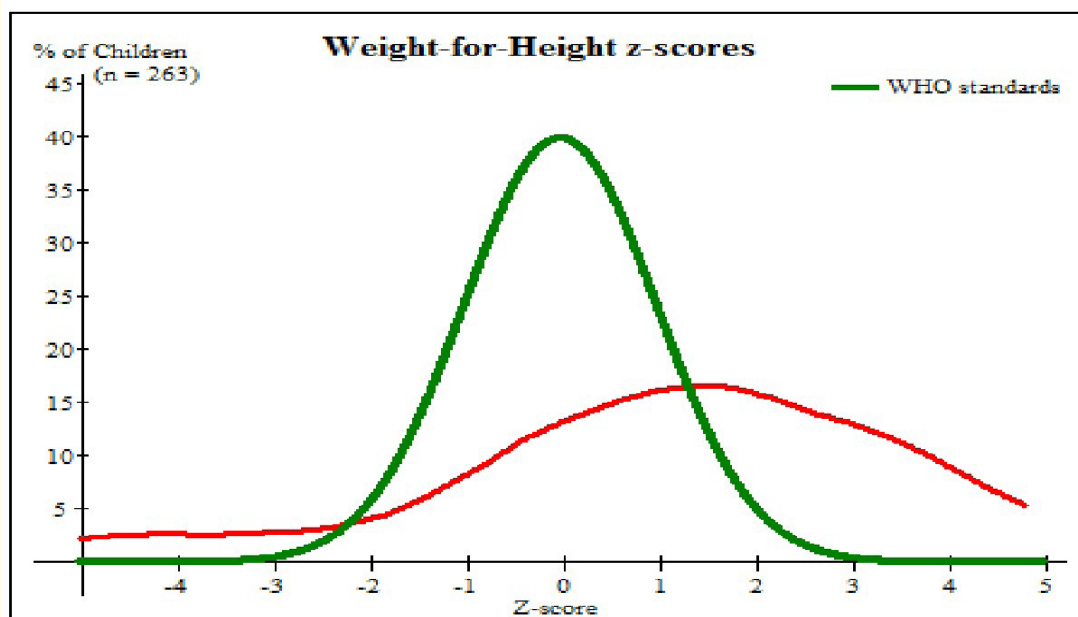


Figure 2: Kanyasa Ward Weight for Height Z-Scores.

**Prevalence of Acute Malnutrition (Wasting) by Age Based on Weight-For-Height Z Scores and or Oedema (WHO Standard 2006)**

The children were categorized into age groups to examine the effect of age on nutritional status. This is necessary to guide the targeting of interventions taking into account the vulnerabilities in relation to a child’s life cycle [8]. The nutrition baseline data reveals that 9.5% of children in Karungu Division are moderately wasted or too thin for their height. Acute malnutrition was high (GAM 13.8%) among the younger children (ages 6 - 17 months), a time when the effects of poor or inappropriate feeding practices are experienced in the area due to the harsh drought prevailing in Nyatike Sub County. Acute malnutrition was also high (GAM 10.4%) in the age category among children 42-53 months old (Table 5).

Age (month)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6 - 17	240	24	10.0	9	3.8	207	86.3	0	0.0
18 - 29	236	15	6.4	3	1.3	218	92.4	0	0.0
30 - 41	192	9	4.7	3	1.6	180	93.8	0	0.0
42 - 53	173	12	6.9	6	3.5	155	89.6	0	0.0
54 - 59	42	3	7.1	0	0.0	39	92.9	0	0.0
Total	883	63	7.1	21	2.4	799	90.5	0	0.0

Table 5: Prevalence of Acute Malnutrition by Age, Based on Weight-For-Height Z-Scores and/or Oedema.

### Prevalence of underweight

The rate of underweight children in Karungu Division is at 9.6% with the boys (11.4%) more affected compared to girls (7.9%) as presented in table 6.

Nutritional Status Indicator	All n = 921	Boys n = 437	Girls n = 484
Prevalence of global underweight ( $<-2$ z-score)	(88) 9.6 % (0.9 - 55.8 95% C.I.)	(50) 11.4 % (2.6 - 38.6 95% C.I.)	(38) 7.9 % (0.0 - 99.4 95% C.I.)
Prevalence of moderate underweight ( $<-2$ z-score and $\geq-3$ z-score)	(44) 4.8 % (1.2 - 17.6 95% C.I.)	(23) 5.3 % (0.1 - 82.2 95% C.I.)	(21) 4.3 % (0.0 - 99.1 95% C.I.)
Prevalence of severe underweight ( $<-3$ z-score)	(44) 4.8 % (0.2 - 56.8 95% C.I.)	(27) 6.2 % (2.3 - 15.6 95% C.I.)	(17) 3.5 % (0.0 - 96.4 95% C.I.)

**Table 6:** Prevalence of Underweight Based on Weight-For-Age Z-Scores by Sex.

By age group, children in the age group 42 - 53 months are more affected at 11.8% followed by 30 - 41 months at 10.6% as shown in table 7.

Age (month)	Total no.	Severe underweight ( $<-3$ z-score)		Moderate underweight ( $\geq-3$ and $<-2$ z-score)		Normal ( $\geq-2$ z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6 - 17	242	11	4.5	8	3.3	223	92.1	0	0.0
18 - 29	243	11	4.5	12	4.9	220	90.5	0	0.0
30 - 41	198	3	1.5	18	9.1	177	89.4	0	0.0
42 - 53	179	15	8.4	6	3.4	158	88.3	0	0.0
54 - 59	44	2	4.5	0	0.0	42	95.5	0	0.0
Total	906	42	4.6	44	4.9	820	90.5	0	0.0

**Table 7:** Prevalence of Underweight by Age, Based on Weight-For-Age Z-Scores.

### Prevalence of Stunting

Children whose height-for-age is below minus two standard deviations ( $-2$  SD) from the median of the reference population are considered stunted or short for their age. Stunting is the result of failure to receive adequate nutrition over an extended period and may also be affected by recurrent or chronic illness. Over a quarter (37.8%) of children below 5 years in Karungu division are stunted compared to 26% of Kenyan children who are stunted [1,9]. Of the children who were stunted, 12.3% were moderately stunted and 25.5% severely stunted. Analysis of stunting by sex of the child reveals that 38.2% of the boys below 5 years in Karungu are stunted compared to 37.5% for girls. The baseline survey therefore reveals that stunting in Nyatike is higher than the national average of 26% (Tables 8-10).

	All n = 917	Boys n = 437	Girls n = 480
Prevalence of global stunting ( $< -2$ z-score)	(347) 37.8 % (13.7 - 70.0 95% C.I.)	(167) 38.2 % (27.1 - 50.7 95% C.I.)	(180) 37.5 % (6.7 - 83.3 95% C.I.)
Prevalence of moderate stunting ( $< -2$ z-score and $\geq -3$ z-score)	(113) 12.3 % (0.3 - 86.9 95% C.I.)	(59) 13.5 % (0.2 - 92.2 95% C.I.)	(54) 11.3 % (0.4 - 79.2 95% C.I.)
Prevalence of severe stunting ( $< -3$ z-score)	(234) 25.5 % (16.8 - 36.7 95% C.I.)	(108) 24.7 % (4.0 - 72.2 95% C.I.)	(126) 26.3 % (13.7 - 44.5 95% C.I.)

**Table 8:** Prevalence of Stunting Based on Height-For-Age Z-Scores and by Sex.

Age (mo)	Total no.	Severe stunting ( $< -3$ z-score)		Moderate stunting ( $\geq -3$ and $< -2$ z-score)		Normal ( $\geq -2$ z score)	
		No.	%	No.	%	No.	%
6 - 17	242	60	24.8	33	13.6	149	61.6
18 - 29	243	71	29.2	34	14.0	138	56.8
30 - 41	198	45	22.7	31	15.7	122	61.6
42 - 53	179	49	27.4	11	6.1	119	66.5
54 - 59	44	9	20.5	3	6.8	32	72.7
Total	906	234	25.8	112	12.4	560	61.8

**Table 9:** Prevalence of Stunting by Age Based on Height-For-Age Z-Scores.

	All n = 900	Boys n = 430	Girls n = 470
Prevalence of overweight (WHZ $> 2$ )	(350) 38.9 % (33.9 - 44.2 95% C.I.)	(149) 34.7 % (10.9 - 69.6 95% C.I.)	(201) 42.8 % (13.3 - 78.4 95% C.I.)
Prevalence of severe overweight (WHZ $> 3$ )	(209) 23.2 % (5.0 - 63.3 95% C.I.)	(81) 18.8 % (1.7 - 75.4 95% C.I.)	(128) 27.2 % (11.1 - 53.0 95% C.I.)

**Table 10:** Prevalence of Overweight Based on Weight for Height Cut-off's and by Sex.

### Prevalence of Acute Malnutrition Based on Mid Upper Arm Circumference

Another measurement used to determine a child's nutritional status is the mid-upper arm circumference (MUAC) measurement. Because MUAC measurements require a simple, colour-coded measuring band rather than weighing scales and height boards, they are often used during crisis situations and as a rapid screening tool for admission into nutrition intervention programmes [10,11]. Useful for children between six months and five years of age, a MUAC measurement of less than 12.5 cm indicates that a child is suffering from moderate acute malnutrition. If the MUAC measurement is under 11.0 cm, however, the under-five child's life may be in danger as he or she is suffering from severe acute malnutrition. Compared to WFH z-scores, the mid-upper arm circumference (MUAC) is not a very sensitive indicator of acute malnutrition and tends to overestimate acute malnutrition for children below one year of age [4,12]. However, used,

Overall, MUAC usually tends to indicate lower GAM levels compared to WFH z-scores. The baseline findings indicates that overall, 4.3% of the children in Nyatike Sub County suffered from GAM (MUAC < 12.5cm), of which 0.5% suffered from SAM (MUAC < 11.5 cm). 16.6 % of the under 5 years were at risk of malnutrition (MUAC >= 12.5 and < 13.5 cm).

### Conclusion

There are poor nutrition outcomes for both the mothers and children and this may be attributed to worsening food security situation within Nyatike Sub County. It is therefore recommended promotion of High Impact Maternal and Child Nutrition Interventions including advocacy campaigns to reach women in active reproductive ages (15 - 49 years), newborns and children both at community and facility levels.

### Conflict of Interest

There no financial interests or any conflict of interest existing.

### Bibliography

1. Kenya National Bureau of Statistics and ICF Macro. "Kenya Demographic and Health Survey". Calverton, Maryland: KNBS and ICF Macro (2014).
2. National AIDS and STI Control Programme and Ministry of Health. "Kenya AIDS Indicator Survey: Preliminary Report". Nairobi, Kenya (2012).
3. World Health Organization. "Neonatal and Perinatal Mortality. Country, Regional and Global Estimates 2004". World Health Organization, Geneva. Switzerland (2007).
4. WHO. "The World Health Report 2006 - Make Every Mother and Child Count". World Health Organization Geneva, Switzerland (2006).
5. Ministry of Health. "Situation Analysis of Adolescent Reproductive Health and Stakeholder Analysis in Nyanza Province. Ministry of Health". Division of Reproductive Health. Government Printers (2006).
6. NHSSP II -2005-2010: The Second National Health Sector United Nations Development Programme. Human Development Report (2009).
7. Jones G., *et al.* "How many child deaths can we prevent this year?" *Lancet* 362.9377 (2003): 65-67.
8. World Health Organization. "Road Map for Accelerating the Attainment of Millennium Development Goals related to Maternal and Newborn Health in Africa". WHO. Geneva (2008).
9. Ministry of Public Health and Sanitation and Ministry of Medical Services. Kenya Service Provision Assessment Survey 2010: National Coordination Agency for Population and Development (2011).
10. President's Emergency Plan for AIDS Relief. Prevention of Mother to Child Transmission. US President's Emergency Plan for Aids Relief (2008).
11. Ministry of Health. "National Reproductive Health Policy. Enhancing reproductive health status for all Kenyans". Ministry of Health (2007).
12. Khan KS., *et al.* "WHO analysis of causes of Maternal Death: A Systematic Review". *The Lancet* 367.9516 (2006): 1066-1074.

Volume 11 Issue 4 October 2017

©All rights reserved by Agatha Christine Onyango and Wycliffe Obade.