The Nexus between Traditional Food Beliefs and Nutritional Status of Children Below Two Years
A Case Study of the Giriama in Kilifi County Kenya

*Patricia Mwaka Mbogoh[1] Jackin Nanua[2], Grace Ettyang[3] Halimu Shauri[4]

1. Pwani University, School of Health and Human Science, Department of Food Nutrition and Dietetics, P.o Box 195- 80108 Kilifi County, Kenya
2. Department of Food Nutrition and Dietetics, Pwani University,P.o Box 195- 80108 Kilifi County,Kenya
3. Department of Human Nutrition Moi University, College of Health Sciences. P.o Box 3900-30100 Eldoret.
4. Halimu Shauri (Prof.) Department of Sociology, Pwani University. P.o Box 195, 80108 Kilifi County, Kenya.

Corresponding Author: Patricia Mwaka Mbogoh, Pwani University,
School of Health and Human Science, Department of Food Nutrition and Dietetics,
P.o Box 195- 80108 Kilifi County, Kenya Email: p.mbogoh@pu.ac,ke

Summary

INTRODUCTION

Giriama traditional food beliefs tend to seriously affect most women of reproductive age and children below 5 years of age. They were identified through focus group discussions. The beliefs develop over a period of time in communities for purposes of self-preservation. In most cases, they were centered around superstition, healing, protection against evil spirits and diseases.

OBJECTIONS

The purpose of this study was to identify and assess the influence of Giriama traditional food beliefs on physical growth of children under 2 years in Kilifi County.

METHODOLOGY

The study was conducted between July and December 2017. The level of adherence to traditional food beliefs among the 202 respondents from Focus Group Discussions (FGDs) selected was computed using principal component analysis. Three levels of adherence were established using the Likert scale high, mid and low. Anthropometry of repondents was correlated to their mothers' level of adherence to determine the effect of the beliefs on their physical growth.

RESULTS

Mean anthropometry by adherence to food beliefs level showed significant association between WAZ (P=0.0002), WLZ (P=0.01), and MUAC (P=0.0002) respectively. Length for age was not associated with adherence. In the multivariate analysis, compared to low adherence, high adherence was associated with underweight (WAZ<-2) adjusted OR 2.43 (95% CI 1.12-5.31) and low MUAC (<12.5cm) adjusted OR 2.56 (95% CI 1.22-5.40). Logistic regression showed mother's age had significant effect on all variables association with different anthropometry.

CONCLUSION

Adherence to the Giriama traditional food beliefs was a risk factor for malnutrition and physical growth for children below two years in Kilifi County. The postpartum period among the Giriama is marked by confinement of the mother, food restrictions and dietary modifications believed to promote quick healing of the uterus and recovery.

Introduction

Beliefs and traditions of community members have a profound effect on the health of the society. The food proscriptions could contribute to greater morbidity and mortality among young children in societies which adhere to them due to the synergism between malnutrition and many infectious diseases [1]

Cultural food beliefs and taboos were often related to foods of animal origin and mainly affecting women and children among the Giriama community.

Cultural influences could also include attitude towards certain foods, their preparation, breastfeeding and infant feeding practices. In terms of food choice, some foods were expensive than others.

A meal was never considered complete until the chosen foods were included. Should the favorite food be a root or tuber, children were the most disadvantaged group. A weaning diet based on roots and tubers was bulky and had low concentration of nutrients unless enriched with additional foods such as fats, oils, fruits and vegetables [2]

The Giriama are one of the nine Bantu ethnic groups inhabiting on the Coastal Strip of Kenya between the Sabaki River to the North and the Umba River to the South on the Kenya Tanzania border. Chonyi, Giriama, Jibana, Kambe, Kauma, Rabai, and Ribe are found mainly to the North of Mombasa. While the Digos and Durumas were found to the South of Mombasa [3]

Each ethnic group had unique custom, dialect of the Mijikenda language and could communicate with each other easily. They had fairly similar traditions.

Most people in Kilifi depend on subsistence farming. Unfortunately frequent rain failure has resulted in insufficient crop yields, compromised food access and shortage in the common population [4].

The Giriama community is rich in cultural food beliefs and taboos, which affect food choices. They have cultural beliefs regarding pregnancy, sexuality and the etiology of severe malnutrition [5].

Beliefs

A Giriama belief that, when a mother with an infant or toddler becomes pregnant, 'the heat' from the unborn child burns the toddler when he/she sleeps with the mother *(kuhenderwa / hombo ra chere),* leading to severe malnutrition [6]

That belief contraindicates the assumption that, malnutrition was as a result of inadequate food intake. Instead a consequence of violation of culture with regards to pregnancy.

Hence, reparation targets the beliefs and not the actual cause of malnutrition resulting in poor physical and mental growth in children. In addition, the Giriama belief that, a breach of sexual taboos *(chira)* by either parent can lead to severe malnutrition in children conceived subsequently to the transgression [6]

The relationship between cultural beliefs and severe malnutrition is not fully elucidated. The food laws that might have had negative effect on nutrition their contribution to growth and development of children among the Mijikenda communities have not been adequately studied.

Giriama traditional food beliefs tend to seriously affect most women of reproductive age and

children below 5 years of age. It peculiarly inhibit the consumption of protein rich foods which are, vital for growth and development.

Intra family food distribution was often related to hierarchal position, with the head of the family (father) receiving priority to eat while the mother and children receive a smaller portion of the family foods, relative to their needs [2]

Food beliefs were not always compatible with survival of weaker members of the society nor with the achievement of optimum health. This was because foods were chosen from the array that was available. They could also influence systems of food sharing and distribution within the family.

Further, where the order of serving food was to the children first, children would have a high likelihood of having good feeding relative to when the father was served first [7].

Among the Mbeere, children were not allowed to eat *offal* as it was believed that this would interfere with their growth. Pregnant women were not allowed to take bitter substances such as juices from medicinal trees. They were not allowed to eat *offal,* nor touch gourds of milk nor open a granary [2].

Among the Embu of Kenya, pregnant women could not eat food that included beans as it was believed that this would cause constipation, and therefore discomfort [8]

Some ethnic groups in Western Kenya have traditionally prohibited pregnant women from eating eggs even where there is an abundant supply. The reason often given was that;

If women and children are allowed to eat eggs, there would be no chickens.

In the same communities, chicken meat is a delicacy reserved for men and guests only.

Among traditional Maasai community, a pregnant woman was advised to avoid fatty foods and instead drink cow's blood, sour milk and lots of water. That was to keep the baby small at birth and ensure safe delivery [8]

Good health amongst Africans was not based merely on how it affects the living, but because it was of paramount importance their ancestors stay healthy so as they can protect the living [9].

In their understanding, good health was believed to be as a result of appropriate behavior. That was, living in accordance with the values and norms of the traditions of society [9] Socio-cultural beliefs and customs have a significant influence on family nutritional well-being

In 2011 a study done in Kilifi county, mothers reported their local cultural belief that severe malnutrition was due to witchcraft and the violation of sexual taboos. Treatment of malnutrition can be complicated by the fact that, some families consult traditional healers when their children are chronically sick. often the healers misdiagnosed malnutrition cases and linked it to evil spirits, aggravating the problem. [6]

The authors acknowledge that in any nutritional intervention, knowledge of the beliefs and behaviors of mothers was a significant consideration.

Stunting in Kilifi County currently stands at an alarming prevalence level of 39.1%. This indicates that 39.1% of the children less than 5 years do not reach their full growth potential. The less than 5 mortality is 141 per 1000 and approximately 6.2 – 9.1% of children remain at risk for malnutrition [10].

The county interventions to improve Nutrition and hence physical growth of children had rarely addressed traditional food beliefs of these communities which determine feeding practices and nutritional quality of food selected by mothers for their children.

Accordingly, questions of what food beliefs are practiced by these communities (in this study the Giriama Community) and how these beliefs impact on physical growth of children in Kilifi County remain unclear.

Objectives

The purpose of this study was to identify and assess the influence of Giriama traditional food beliefs on physical growth of children < 2 years in Kilifi County.

The study attempts to answer the following research questions

1. What traditional food beliefs exist among the Giriama community in Kilifi County?

2. What is the level of adherence of mothers to these food beliefs among the Giriama?

3. What is the nutritional status of children < 2 years among the Giriama in Kilifi County?

Methodology

2.1: Study Area and Design

The study was conducted in Kilifi County between July 2017 and December 2017. Kilifi is located on the Kenyan Coastal region and it is divided into 7 Sub Counties. Namely;

(a). Kilifi North

(b). Kilifi South

(c). Rabai

(d). Kaloleni

(e). Magarini

(f). Malindi

(g). Ganze

It occupies an area of approximately 12,609.7 km square and a population of 1, 466, 856 people. The livelihood zones include;

    a. Marginal mixed farming

    b. Livestock / Ranching

    c. Cash cropping/Dairy farming

    d. Food cropping

The study employed cross sectional design that interviewed mothers who had children of less than two years and more than six months old. The centre of interest was child nutritional status (WAZ, WLZ, LAZ and MUAC). The main exposure examined was the level of adherence to the Giriama traditional food beliefs.

Statistics indicate that 4.7% and 18.2% of children under five years are wasted and underweight across the County. Despite numerous interventions malnutrition continues to ravage the lives of under-fives in Kilifi County[12].

2.2: Study Population

The study population was a group of Giriama mothers with their children of less than 2 years and more than six months old in Kilifi County. Children below two years were considered ideal since they were entirely dependent on their mothers for food. The inclusion criteria required that:

    (i)   Mothers were native Giriama and residents of the study area

    (ii)   The mothers were either expectant or had one or more children less than 2years

2.3: Sample Size And Sampling Procedure

A total of six Focus Group Discussions (FGDs) comprising of either 10 male or 10 females were conducted in three randomly selected villages namely Midoina and Kafuloni in Ganze, and Marereni in Magarini to identify the Giriama traditional food beliefs. In this regard phase one of the study was exploratory, scooping out the traditional food beliefs of the Giriama.

In phase two of the study, purposive sampling was used to select 30 mothers from each of the 8 randomly selected villages in the two sub-counties. Six villages were selected in Ganze Sub County and two villages in Magarini Sub County.

Population density versus kilometer square per person was used as the criteria for selecting the number of villages. A total of 202 mothers and 202 children participated in the study

The area chief was useful during the sampling process to obtain a sample that would help determine the level of adherence to the Giriama food beliefs.

A sample size of 30 was considered adequate for qualitative studies following the concept of saturation where new data does not shed any further light on the issue under investigation. In phase 3 of the study, children of mothers in phase two were screened to asses physical growth.[13].

2.4: Data Collection Procedure

Focus Group Discussions (FGDs) were conducted to identify the Giriama traditional food beliefs in phase one of the study. In phase two of the study, respondents signed the consent form and were interviewed to determine their level of adherence to the Giriama traditional food beliefs.

Dietary history for both the mother and the child were obtained through the use of the 24-hour recall method Physical growth of children < 2 years were determined by the use of Anthropometry. The Anthropometry parameters included age, height, wasting, weight, Mid Upper Arm Circumference (MUAC).

2.5: Data analysis

Data from the FGDs were transcribed and reviewed for meaning to resolve ambiguity. A deductive Code book was developed. Data was coded to identify and analyze relevant themes and patterns in food beliefs, while connecting them to the research question.

In phase two of the study data was entered, checked for missing values and outliers, then finally analyzed with SPSS, version 16.1.

The calculations for ; Weight-for-length, Weight-for-age and Length-for-age z-score were done using the WHO 2006 growth reference where;

    i   a- 3Z   score = severe malnutrition,

    ii.   a- 2Z   score = moderate malnutrition,

    iii.   a- 1Z   score = mild malnutrition.

To select demographic and anthropometric variables to include in the binary logistic regression, *chi-square test* of associations was used to examine evidence of bivariate association with adherence levels. Logistic regression analysis was used to examine the effects of adherence to Giriama taboos on different anthropometry.

The exposure (adherence to Giriama taboos) was categorized into three groups; low adherence, and high adherence. Adherence to Giriama food beliefs was determined using Principal Component Analysis (PCA) and the *Likert Scale*. The PCA utilized eight variables that best described adherence to the food beliefs by mothers.

The *Likert Scale* was used to establish the levels of adherence to the beliefs. Logistic regression analysis was used to examine the effects of adherence to Giriama food beliefs on different anthropometry. In the Univariate regression analysis, only the adherence variable was included in the model.

In the multivariate analysis, likely confounders (child age, mother age, mother BMI, occupation, education level and recruitment site) were included in the model and used backwards stepwise approach to retain variables with P<0.1 but reported those with P<0.05.

To identify the predictors of adherence to the traditional food beliefs only variables that were significantly associated at (p < .05) in the bivariate analyses were entered into multi-variable binary logistic regression models. In all tests, P < .05 was considered to indicate statistical significance.

2.6: Ethical clearance

The research protocol was explained to the participants and they signed consent forms agreeing to participate in the study. Consent from mothers was obtained before their children were involved in the study. Personal information obtained during the study was held in confidence and no information was published in any manner likely to identify the study participants.

The research proposal was submitted to the ethical review board of Pwani University for approval and advice and a research permit was obtained from the National Research Fund (NRF).

3.0: Results

3.1: Demographic Characteristics Of The Participants

A total of 202 study mothers with their children participants were recruited.

Table 1: *Mother and Children Participants' Characteristics*

Participants features	Results
Demographic characteristics of mothers	
Age in months; median (IQR)	27 (22 to 32)
Education level	
None	**62 (31)**
Primary	**117 (58)**
Secondary	**13 (6.4)**
Tertiary	**10 (5.0)**
Occupation	
Unemployment	**99 (49)**
Farming	**20 (9.9)**
Business	**21 (10)**
Others	**22 (11)**
Missing	**40 (20)**

The median age (IQR) of the children caregivers was 27 (22 to 32) years. Majority of the mothers had primary level eduction-117 (58%) (Table 1). Approximately half of the mothers 99/202 (49%) were unemployed, whilst 40/202 (20%) did not provide response to this question suggesting they too could be unemployed or have no source of income

3.2: The Giriama traditional food beliefs

Table 2 below is a summary of the food prohibitions and beliefs behind the prohibitions

Table 2: *Summary Of Food Prohibitions and Beliefs Among The Giriama During Pregnancy*

	Prohibited Food Items in pregnancy	**Belief that supports the prohibition/taboos**
1.	*Ng'onzi* (lamb meat)	Causes *kufurisha* (edema) in pregnant women
2.	Roast meat	Causes stomach-ache
3.	Eggs	Give birth to baby with a bald head or to big baby
4.	*Papa* (Dried fish- shark)	Triggers a spontaneous abortion
5.	Rabbit	Baby will be born with big ears
6.	*Matumbo ya mbuzi*/goat (*Offal* from the goat)	Can result in birth complications, over bleeding, prolonged labour
7.	Seafood	Birth complications/prolonged labour/lack sleep/constipation
8.	Sour milk	Causes abortion and has a lot of fat
9.	*Uholwe* (Cold Ugali)	Causes *Kuvimbirwa* (flatulence)
10.	*Marabu* (Pumpkin)	Causes *tsango* (prolapsed cervix and rectum)
11.	Raw cassava	Causes Stomach cramps
12.	Pawpaw	Causes Stomach cramps
13.	Pure (pounded maize)	Causes *tsango*
14.	Sweet potatoes	Triggers abortion
15.	Bananas	Triggers abortion
16.	Sugarcane	Triggers abortion
17.	Salt	Triggers abortion

	Prohibited Food Item during the nursing period after birth	
1.	Cooked meat, chicken, silver fish, milk, shark fish, coconut, sorghum products, cassava leaves, cow pea leaves , pure, left over ugali (uholwe) or food , young maize, left over vegetables, muwa manga,(cassava),pawpaw, cold food	*"Ndani ni mbitsi"* (Stomach is raw)

	Prohibited Food Item in child hood	Belief that supports the prohibition
1.	*Finyingi* (Gizzard)	*"Rinariwa ni mwenye mudzi"* (eaten by the head of the home) – child eating it signifies disrespect for the head of the home.
2.	*Ngwidi* (Chicken tail)	For the woman of the home to show respect
3.	Pumpkin	Causes flatulence
4.	Fresh meat	Can lead to *Nyago wa kafulo*
5.	*"Maharagwe"* (Beans)	Causes *"kuvumbirwa"* (bloating)

	Prohibited Food Item in Infancy	Belief that supports the prohibition
	Infants (up to 2 yrs.)	Reason for Prohibition among the Giriama
1	Gizzards	Reserved for the head of the home
2	Tongue *(Lwimi)*	It's for the head of the home who is the voice of authority and conveyor of the messages through speaking
3	*Kilamo* contained in Fore breast milk	Weakens child health and causes diarrhea in infants. It is usually expressed out

3.3: The Level Of Adherence To The Giriama Traditional Food Beliefs Among Mothers and Children

The 24 hour food recall was used to validate the adherence to the food beliefs mentioned in phase one of the study

Table 3: *Table Showing Proportion Of Children and Mothers Consuming The Food Item 24 Hours Prior To The Survey*

Food recall in the last 24hrs (N=202)	Proportion of children taking the food (N (%, 95% CI))	Proportion of mothers taking the food (N (%, 95% CI))
Porridge	180 (89 (95% CI 84, 93))	85 (42 (95% CI 35, 49))
Ugali/sima	127 (63 (95% CI 56, 70))	195 (97 (95% CI 93, 99))
Kumbu/Omena	32 (16 (95% CI 11, 22))	59 (29 (95% CI 23, 36))
Viazi Karai	20 (9.9 (95% CI 6.1, 15))	-
Roasted maize	-	7 (3.5 (95% CI 1.4, 7.0))
Cow milk	50 (25 (95% CI 19, 31))	18 (8.9 (95% CI 5.3, 14))
Mkunde	27 (13 (95% CI 8.9, 19))	43 (21 (95% CI 16, 28))
M'chicha	25 (12 (95% CI 8.2, 18))	38 (19 (95% CI 14, 25))
Sukuma wiki	11 (5.5 (95% CI 2.7, 9.5))	25 (12 (95% CI 8.1, 18))
Kigwada	1 (0.5 (95% CI 0.01, 2.7))	
Kunde	-	22 (11 (95% CI 7.0, 16))
Breast milk	82 (41 (95% CI 34, 48))	-
Tea	31 (15 (95% CI 11, 21))	-
Beans	55 (27 (95% CI 21, 34))	87 (43 (95% CI 36, 50))
Water	5 (2.5 (95% CI 0.8, 5.7))	
Githeri/mthokoi	-	7 (3.5 (95% CI 1.4, 7.0))
Wheat based products (scones)	-	80 (40 (95% CI 33, 47))
Beef stew	5 (2.5 (95% CI 0.8, 5.7))	-
Other Fish	10 (5.0 (95% CI 2.3, 8.9))	22 (11 (95% CI 7.0, 16))

Amongst the children participants, 180/202 (89%) had taken porridge in the preceding 24 hours and this was the most common food reported **(Table 3).** Breastfeeding was not practiced by all mothers. Less than 50% (82/202 (41%)) of the children had been breastfed at the time of this interview. 50 (25%) had been introduced cow milk. This shows breastfeeding was the preferred method of infant feeding compared to cow milk.

Vegetables were rarely eaten by these children. The percentage of the consumed ratio was;
    Sukuma wiki-5.5%,
    M'chicha-12%
    Mkunde-13%
(Table 7). 55 (27%) of the children were fed on beans.

The most consumed source of protein was the *Omena (kumbu)* 59 (29%) and 32(16%). Other fish were

consumed by 22 (11 %) of the mothers. Sixteen percent (16%) of children and 10 (5.0%) had consumed *kumbu* and other fish respectively in the last 24 hours before the survey.

Other fish-5% and beef stew-2.5% were very rarely fed to these children (Table7). None of the respondents reported having eaten eggs 24 hours prior to the survey.

3.3.1: Childhood Diseases

The study also validated adherence to the beliefs by examining knowledge and the perceived causes of / or awareness of the childhood disease linked to nutrient deficiency. *(Table: 4)* below summarizes the knowledge and perceived cause of childhood diseases among the Giriama

Table 4: *Knowledge and Perceived Cause Of Childhood Diseases*

Knowledge of childhood infectious diseases (N=202)	N (%)
Aware of Kumwaga/ diarrhoea	199 (99)
Perceived cause of diarrhoea	
Poor hygiene	164 (81)
Teeth germination	23 (11)
Others	12 (5.9)
Aware of diarrhoea accompanied by vomiting	197 (98)
Perceived cause of diarrhoea accompanied by vomiting	
Poor hygiene	154 (76)
Some infection	24 (12)
Teething	8 (4.0)
Kuchafuka tumbo (Contaminated stomach/body)	4 (2.0)
Allergy	4 (2.0)
Not known	2 (1.0)
Others	1 (0.5)
Aware of chirwa	168 (83)
Perceived cause of chirwa	
Marital unfaithfulness during pregnancy on either partner	168 (83)
Aware of Nyago/Nyuni	126 (62)
Perceived cause of Nyago/Nyuni	
Malaria	39 (19)
Serious fever	30 (15)
Not known	23 (11)
Evil spirit (pepo)	25 (17)

Aware of Vitio / Mavingane	167 (83)
Perceived cause of Vitio/Mavingane	
Sexual acts with relatives	114 (56)
Indiscriminate use of personal items	47 (23)
Incest	6 (3.0)
Having sex in your in-law house	1 (0.5)
Aware of Kwashiorkor	185 (92)
Perceived cause of Kwashiorkor	
Lack of/poor feeding	138 (68)
Malnutrition	31 (15)
Early weaning	9 (4.5)
Not known	7 (3.5)
Aware of Lugwizo	116 (57)
Perceived cause of Lugwizo	
Close conceptions	104 (52)
Not known	2 (1.0)
Other	10 (5.0)

With the exception of kwashiorkor, all the perceived causes of the traditional childhood disease mentioned were not associated with nutrient deficiency. Causes mentioned were sexually related, spirit related, hygiene related or conception related.

3.3.2: Level of adherence to the Giriama traditional food beliefs among mothers

The study measured the level of adherence to the Giriama traditional food beliefs based on the food practices of the mothers and beliefs
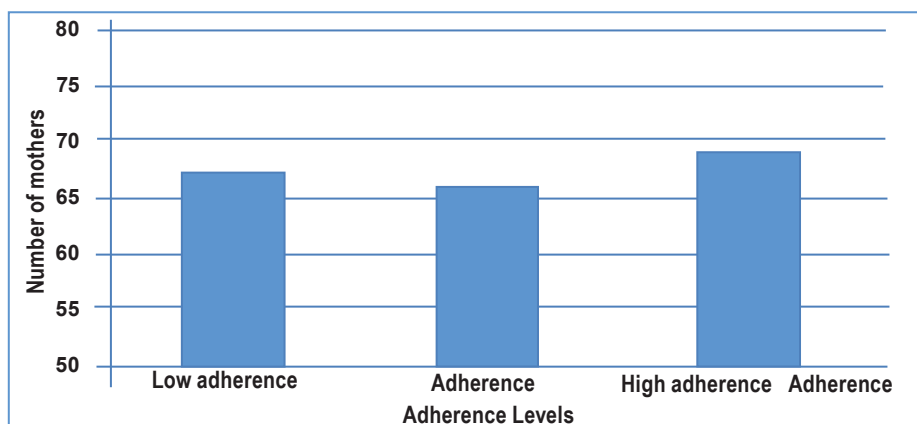

Figure 1: Adherence to Giriama taboos levels

The results indicate that all mothers had some level of adherence to the Giriama traditional food beliefs .Of the 202 study participants; 67 (33%) had low adherence, 66 (33%) had good adherence and 69 (34%) had high adherence levels *(Figure 1)*

3.4: Nutritional Status Of Child Participants In Kilifi County

Their median age of children was (IQR) was 12 (8 to 18) months and 114 (56%) were girls.

Table 5: *Children Participants Anthropometry*

Age in months; median (IQR)	12 (8 to 18)
Sex-Females	114 (56)
Recruitment site	
Ganze	84 (42)
Bamba	60 (30)
Magarini	57 (28)
Anthropometry	
Weight-for-age z-score (WAZ); mean ±sd1	-1.52 ±1.6
WAZ ≥-2	117 (59)
WAZ -3 to -2	46 (23)
WAZ <-3	36 (18)
Weight-for-length z-score (WLZ); mean ±sd2	-0.76 ±1.9
WLZ ≥-2	151 (76)
WLZ -3 to -2	29 (15)
WLZ <-3	18 (9.1)
Length-for-age z-score (LAZ); mean ±sd1	-1.70 ±2.4
LAZ ≥-2	111 (56)
LAZ -3 to -2	40 (20)
LAZ <-3	48 (24)
Mid Upper Arm Circumference (MUAC)-cm; mean ±sd3	12.92 ±1.7
MUAC ≥ 12.5	106 (57)
MUAC 11.5 to 12.5	47 (25)
MUAC<11.5	33 (18)
Head circumference z-score (HCZ); median (IQR)1	-1.69 (-3.8 to 0.12)
HCZ ≥-2	110 (55)
HCZ -3 to -2	25 (13)
HCZ <-3	64 (32)
Chest circumference-cm: median (IQR)1	44 (38 to 47)
The results are N (%) unless where specified, IQR-Interquartile range, sd-standard deviation, 1-3 participants missing data, 2-4 participants missing data,3-16 participants missing data	

The mean (sd) WAZ, WLZ, LAZ and MUAC were -1.52 (1.6), -0.76 (1.9), -1.70 (2.4) and 12.92 (1.7) cm respectively *(Table 5)*.

Underweight (WAZ<-2), wasted (WLZ<-2) and stunted (LAZ<-2) were present in 82/202 (41%), 47/202 (23%) and 88/202 (44%) children respectively. Whilst 36/202 (18%), 18/202 (9.1%) and 48/202 (24%) children were severe underweight, wasted and stunted.

A MUAC cut-off <11.5cm denoting severe wasting was present in 33 (18%) similar to the proportion identified by WLZ<-3. The median head circumference z-score (IQR) was -1.69 (-3.8 to 0.12) cm and 64/202 (32%) had HCZ <-3 *(Table 5)*.

Table 6: *Mothers Participants Anthropometry*

Anthropometry	
Weight-Kgs; median (IQR)1	50 (45.4 to 56)
Height-cm; median (IQR)1	156.5 (153 to 160)
Body Mass Index(BMI); mean ±sd1	20.8 ±3.6
Underweight (BMI<18.5)	47 (23)
Normal (BMI 18.5 to 25)	129 (64)
Overweight (BMI ≥25)	23 (11)
Mid Upper Arm Circumference (MUAC)-cm; median (IQR)2	24 (22.5 to 25.5)
Waist size-cm; median (IQR)1	72 (32 to 81)
Hip size-cm; median (IQR)1	85 (38 to 92)

The results are N (%) unless where specified, IQR-Interquartile range, sd-standard deviation, 1-3 participants missing data, 2-132 participants missing data.

Their median weight, height, MUAC, waist size and hip size (IQR) were 50 (45.4 to 56) Kgs, 156.5 (153 to 160) cm, 24 (22.5 to 25.5) cm, 72 (32 to 81) cm and 85 (38 to 92) cm respectively. Their mean (sd) body mass Index (BMI) was 20.8 (3.6). 129/202 (64%) of the mothers had BMI between 18.5 and 25 denoting normal group, whilst 47/202 (23%) and 23/202(11%) had BMI denoting underweight and overweight respectively *(Table 6)*.

3.5: Assessment Of The Influence Of The Giriama Traditional Food Beliefs On Physical Growth Of Children Below 2 Years

Table 7: Difference In Mean Anthropometry By The Adherence Levels.

Adherence to	Low adherence	Good adherence	High adherence	P-value*
	Mean ±sd	Mean ±sd	Mean ±sd	
WAZ	-0.88 ±1.5	-1.68 ±1.7	-1.96 ±1.4	0.0002
WLZ	-0.37 ± 1.5	-0.69 ±1.8	-1.19 ±1.4	0.01
LAZ	-1.44 ±1.6	-1.96 ±1.8	-1.51 ±2.4	0.28
MUAC (cm)	13.63 ± 1.6	12.7 ±1.6	12.52 ±1.6	0.0002

*p-values from analysis of variance (ANOVA)

Children with low adherence had the highest weight-for-age z-score (mean of - 0.88) compared to those with high adherence (mean of -1.96) P=0.0002 *(Table 7* and *Figure 2*A below). Similarly, children with low adherence had the highest weight-for-length z-score (mean of -0.37) compared to those with high adherence (mean of -1.19) P=0.01 *(Table 7* and ***Figure 2B below).***

However, the length-for-age z-score did not different across the adherence levels (P=0.28) The MUAC levels differed significantly across the groups P=0.0002

Box plot of; A-weight-for-age, B-weight-for-length, C-Length-for-age z-scores and D-MUAC (cms) by adherence levels.
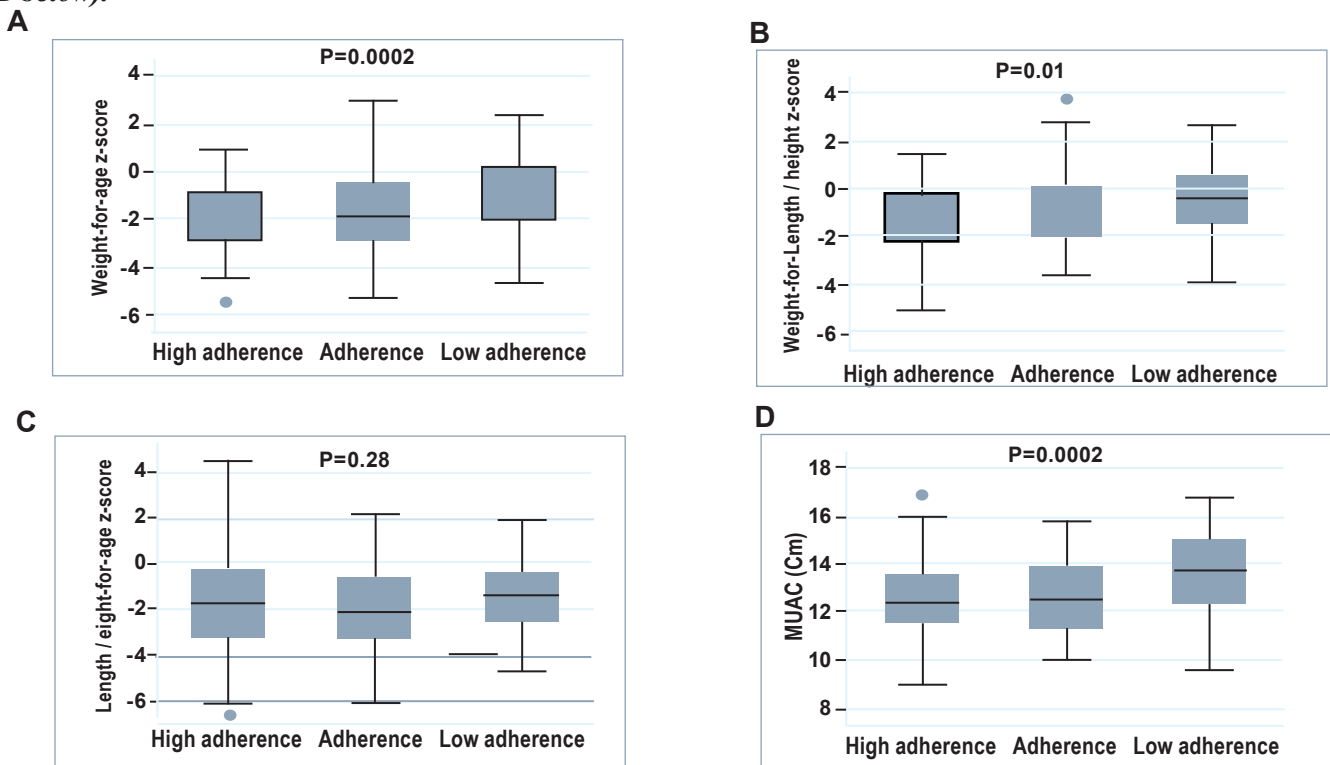

*Figure 2: Box plot of the; **A**-weight-for-age, **B**-weight-for-length, **C**-Length-for-age z-scores and **D**-MUAC (cms) by adherence levels.*

Children with low adherence had the highest MUAC (cm), *Table 7* and *Figure 2c* above. (Mean of 13.63) compared to the high adherence (mean of 12.52) P=0.0002 *(Table 7* and *Figure 2D* above).

Underweight (WAZ<-2)	Univariate analysis			Multivariate analysis		
	Crude OR	95% CI	P-value	Adjusted OR	95% CI	P-value
Low adherence		Reference			Reference	
Adherence	2.45	1.18-5.10	0.02	2.13	0.96-4.69	0.06
High adherence	3.21	1.55-6.63	0.002	2.43	1.12-5.31	0.03
Child age (months)				1.12	1.06-1.18	<0.001
Mother age (years)				1.06	1.10-1.12	0.01
Low MUAC (<12.5cm)	**Univariate analysis**			**Multivariate analysis**		
Low adherence		Reference			Reference	
Adherence	2.1	1.01-4.35	0.04	1.99	0.94-4.21	0.07
High adherence	2.96	1.43-6.11	0.003	2.56	1.22-5.40	0.01
Child age (months)				1.08	1.03-1.14	0.003
Wasted (WLZ<-2)	**Univariate analysis**			**Multivariate analysis**		
Low adherence		Reference			Reference	
Adherence	1.65	0.68-4.02	0.27	1.53	0.62-3.78	0.36
High adherence	2.11	0.89-5.03	0.09	1.81	0.75-4.40	0.19
Child age (months)				1.08	1.02-1.14	0.01
Stunting (LAZ<-2)	**Univariate analysis**			**Multivariate analysis**		
Low adherence		Reference			Reference	
Adherence	2.04	1.01-4.13	0.04	1.92	0.93-3.97	0.08
High adherence	1.29	0.64-2.58	0.48	1.05	0.51-2.17	0.89
Child age (months)				1.09	1.03-1.14	0.001

In the univariate analysis, compared to low adherence, high adherence was associated with underweight (WAZ<-2) and low MUAC (<12.5cm) (Table 8). In the multivariate analysis, compared to low adherence, high adherence was associated with underweight (WAZ<-2) adjusted OR 2.43 (95% CI 1.12-5.31) and low MUAC (<12.5cm) adjusted OR 2.56 (95% CI 1.22-5.40). In the multivariate models, only child and mother age had significant effect on association with different anthropometry *(Table 8).*

Discussion

The Giriama traditional food beliefs revolve around food restrictions and recommendations during critical phases of life. Expectant mothers are restricted from taking protein rich foods such as eggs, lamb, rabbit meat, sour milk, roast meat and innards. The traditional food restrictions were believed to prevent abortions and improve birth results. Contrary to Byrd- Bredbenner and Wardlaws recommendations, pregnancy among the Giriama remains a time of food restrictions [14].

Cooked meat, chicken, silver fish, milk, shark fish, coconut, sorghum products, cassava leaves, cowpeas leaves , pure, left over *ugali (uholwe)* or young maize, left over vegetables *muwa manga*,(cassava), pawpaw, cold food were restricted for nursing mothers as it was believed to aggravate soreness of the mothers uterus after birth.

Only soft and semi-solid foods such as porridge, soft *ugali* , black tea and green leafy vegetables were given to a nursing mother after birth to promote healing of the uterus.. Animal meat was particularly restricted after birth, as it was believed to further inflame the uterus.

The diet of the nursing mothers was composed of food items from; Cereals, Legumes and Vegetables out of the expected seven main food groups of cereals, meat and fish , vegetables, dairy, fats, oils and fruits . The nursing period is marked by an increased demand for food nutrients notably calories [15]

This is needed to facilitate the production of breast milk and replace lost nutrients as a result of the childbirth however food prohibitions increases further with the birth of the baby in the Giriama community. The main belief behind the restriction was to prevent further injury to the stomach and promote healing after birth.

Prelacteal feeds were observed among the Giriama. The main objectives of the prelacteal feeds among the traditional Giriama was to encourage the expulsion of the *meconiium*, and prevent diarrhea. According to the Giriama, *Kilamo* found in the first breast milk after birth is an undesirable substance believed to cause diarrhea in newborns .

This belief propels mothers to delay breastfeeding for at least three days in an effort to get rid of it. The milk is expressed out into a coconut shell filled with ashes and carefully disposed. Failure to do so would attract evil spirits. The common pre-lacteal feeds include coconut juice, black tea and sugared water. The participants reported that these concoctions may be given up to three days before the commencement of breastfeeding. .

These findings corroborates with the [16] report on the Giriama believe that, breast feeding should begin 3 to 7 days after birth.. Similar findings were reported by previous scholars [1,17,18,19] .

Reports from the Department of culture in Kwale County IDRC and Ministry of health reported similar findings to this study [16, 20,21,].

The Kilifi County Nutrition Survey reported that, most people in Kilifi County feed on cereals and consume it for at least 6 out of 7 days in a week [22].

Ninety-seven percent of the respondents report consuming cereals within the last 24 hours prior to the survey . The statistics in the survey indicated that consumption of dark green vegetables was adequate (95% for 5.4 days a week).

However, this findings contradicted the current study reports which show the consumption of dark green vegetables declining among children in Kilifi. None of the respondents reported having eaten eggs in the last 24 hours.

The main source of energy among the Giriama comes from the consumption of maize meal in the form of *ugali.* The consumption of wheat based products was also found to be common, having been reported 40% of the respondents. Only 29% of the women reported having eaten *Omena* [22].

Among the Giriama, *Omena,* a cheaper form of fish was readily available and frequently reported source of animal protein. Its ability to keep for long without spoilage, satiety and cost could have made it most convenient. Beans were the only widely consumed source of protein. As reported in the past studies Giriama diet remains unbalanced, less nutritious, monotonous with a low food diversity index [23].

The least utilized food groups include meat and meat products, dairy and fruits. That could therefore explain the high incidence of protein and iron deficiency among the residence of Kilifi.

The study revealed that approximately 20 % of the new born were not breastfed on the first day of their birth. This implies that, approximately 20% of the infants born in Kilifi County fail to benefit from the protective factors of colostrum obtained through early initiation of breast feeding.

The World health organization recommends that children should be breastfed for six months exclusively. Unfortunately, findings show the Giriama culture recommended breastfeeding up to a time when the child begins to walk.

This cultural tradition ensured that babies were breastfed for a minimum period of one year. Premature cessation of breastfeeding was recommended by the Giriama culture when the mother got pregnant to prevent *Lugwizo*. *Lugwizo* is a childhood diseases characterized by apathy, failure to grow and thrive, muscle weakness and diarrhea.

The symptoms are similar to protein energy deficiency. A study identified similar condition among the Giriama referred to as *kuhenderwa / homborachere*. This condition is said to occur when a mother with an infant or toddler becomes pregnant, and 'the heat' from the unborn child was believed to burn the toddler when they sleep together [6].

That was believed to lead to severe malnutrition Quick successive pregnancies were also said to cause *Lugwizo* in children. The symptoms of *Lugwizo* mimic those of malnutrition. After early introduction of weaning on nutritionally inadequate diet, it usually occurred among under-five years old children in Kilifi County [6].

The mean weaning age in months was 4.7 and the most common weaning meal was maize meal porridge with blue band. Respondents failed to fully adhere to the exclusive breast feeding recommended for infants and young children.

Complementary food introduced was of poor diet guided by traditional food beliefs that were unfavorable for infants. Studies showing decisions on what and how to feed babies was as a result of complex interactions between mothers' beliefs, Educational level, Economic resources and Children's nutritional status [24]

The above factors were significant in the community. The postpartum period among the Giriama was marked by confinement for the mother, food restrictions and dietary modification believed to promote quick healing of the uterus and recovery.

Ugali and porridge were the most consumed food after delivery, consistent with phase one findings that indicated these foods were recommended for faster healing of the uterus. Despite respondents displaying inconsistent knowledge of the function of food after delivery.

The study revealed that, the consumption of food rich in protein after birth was limited, consistently with the traditional food beliefs that restricted the intake of animal protein after birth. Observations show most of the rural Giriama homesteads reared domestic animals such as goats and chicken. Even though these foods did not feature much in the 24 hr. dietary recalls of the respondents.

Despite rearing these animals, protein consumption remains poor. Respondents had knowledge of traditional childhood diseases, others were least knowledgeable on *Lugwizo*. Study showed poor understanding of the dynamics of early initiation of breast feeding, exclusive breastfeeding for six complete months and the gradual introduction of nutritious well balanced complimentary feeds.

Lugwizo was associated with closely spaced births. The consequence of the closely spaced births resulted into abrupt cessation of breastfeeding and early weaning on poor diet, usually white porridge. Respondents frequently sought traditional treatment for traditional diseases.

The respondents clearly differentiated traditional diseases from medical conditions and chose treatment plans based on their beliefs. In some instances, they sought medical treatment after traditional healing had failed exacerbating the disease condition.

Diarrhea / vomiting was the most common reported childhood disease affecting those children -90/202 (45%). With the exception of *kwashiorkor,* all the perceived causes of the traditional childhood disease mentioned were not associated with food.

Causes mentioned were sexually, spiritual, hygiene related or conceptional, indicating that, treatment which was nutrition based was not actually sufficient.

In a study done in Ethiopia, some communities perceived illness to have been caused by the following factors:

1. Supernatural - Almighty God / Allah, Nature spirits.
2. Human agents of the Supernatural.
3. Natural - environmental sanitation and personal hygiene, poverty, biological and psychological factors.
4. Societal causes - social trust, experiences of family support and harmony.
5. Violation of social taboos [25].

Very few respondents (less than 10% in each case) admitted to have experienced any of the traditional diseases. This could have been as a result of phobia, considering the nature of the diseases or effect of the interviewer. However, observations revealed the wearing of protective charms such as the *hirizi* as a proof of exposure to traditional treatment / prevention or a belief in the existence of the diseases.

According other studies, beliefs and perception, ill-health was influenced by the socio-cultural context. Indigenous healers who formed an alternative health service in many societies, would compete with biomedical health services. Especially if it was perceived to be the best way to address specific health matters. Respondents had often sought traditional treatment for common diseases. [26]

There was a link between food beliefs and food intake that determined the nutritional status of mother and child. In this study the level of adherence to the food beliefs was shown to have had no association with education level, occupation nor location but age.

This could then indicate that, traditional food beliefs developed independently devoid of external influence and guided by personal conviction.

In a study done in South Eastern Nigeria approximately 37% of expectant women avoided some foods due to food taboos. No relationship was realized between this food restrictions, maternal education attained, parity (number of obstetrics deliveries) and occupation [27]

The results provided sufficient evidence that adherence to the food beliefs was not confounded by education level, occupation nor income. They develop independently and are shaped to conform to traditional beliefs not influenced by external factors such as money, education nor occupation. They develop over time in communities for purposes of self-preservation.

Traditional practices were still upheld as evident by the wearing of the *Hirizi* (a protective charm worn around the wrist of the child or waist), to chase away evil spirits. The use of traditional herbs, pre- lacteal feeds after birth and the dietary practices evident by the 24 hour recall show high adherence to the traditional food beliefs. The Health Belief Model was adopted as theory that guided the study [28]

The second construct of the HBM views personal risk or susceptibility, as one of the most powerful perceptions in promoting adoption of healthier behaviors. It states that, the greater the perceived risk the greater the likelihood of engaging in behavior that decreases risk and vice versa. In most cases, the Giriama food beliefs are centered around superstition, healing, protection against evil spirits and diseases.

High adherence to the beliefs was associated with underweight. The nutritional status of children below two years whose mothers adhered to the vice was shown to be poor.

With the exception of stunting /length for age, all other anthropometry in the children below two years is influenced by the Giriama traditional food beliefs. Stunting showed no association with adherence to the Giriama traditional food beliefs despite all other nutritional indices doing so.

However, breastfeeding was associated with better Length for Age (LAZ) outcomes. Adherence to the Giriama traditional food beliefs is a risk factor for malnutrition and physical growth of children below two years in Kilifi County

Adherence was driven by perceived susceptibility to the consequences for violating the beliefs. As long as adherence to these beliefs is seen to decrease the risk or susceptibility, the level of adherence remains high. The more factual the perceived susceptibility is seen to be, the stronger the belief and the higher the level of adherence.

Conclusion

The results provide sufficient evidence that adherence to the Giriama traditional food beliefs among mothers, in Kilifi County subsists and contributes to malnutrition. It is associated with low weight for length, lower MUAC levels and low weight for age, hence poor physical growth in children below two years.

Adherence to the food beliefs influence the food choices of mothers. Education level and occupation did not predict the level of adherence to the traditional food beliefs among mothers. Nutritional diseases among the Giriama are traditionally not associated with poor nutrition but violation of cultural taboos unrelated to food consumption.

Consequently treatment does not involve dietary modification but spiritual cleansing resulting to poor diagnosis and treatment. This is exacerbates nutritional health status during critical phases of life such as pregnancy, nursing period and infancy..

Recommendation

There is need to condemn cultural food beliefs of the Giriama as a crucial link to malnutrition in Kilifi County. Health interventions must include cultural approaches to alleviate nutritional deficiency diseases and promote optimal physical growth of children.

It was imperative that the interplay between cultural food beliefs and nutrition form a strong basis for implementing nutrition health interventions in Kilifi County. To achieve this, stake holders ought to:

(a) Dispel myths surrounding cultural food beliefs through informal public education forums.

b) Forums need to include medicine men and women, mothers, community elders, church leaders and women groups. These are powerful agents of changing perceptions and beliefs.

c) Identify cultural food beliefs and practices in the community before implementing nutrition interventions.

d) Promote female economic and social empowerment to improve nutrition health outcome of children below two years.

e) Promote early initiation of breastfeeding

f) Improve Dietary diversity index by re-introducing forgotten local foods which would be readily acceptable, such as pumpkin, bananas, groundnuts, wild fruits such baobab seeds, Vitoria, guavas, grape fruits among others

g) Further research on traditional childhood diseases

References

1. **Lepowsky, M.** Food taboos and child survival: A case study from the Coral Sea Child Survival. *Springer.* 1987 ; 71-92

2. **Oniango O R, Mutuku J & Malaba S J.** Contemporary African food habits and their nutritional and health implications. *Asia pacific Journal of clinical nutrition.* 2003; 12: (**3**)

3. **Sperling, David Colton** (1988), "The Growth of Islam along the Kenya Coast, 1826-1933" School of Oriental and African Studies. University of London.

4. **Kenya Food Security Steering Group (KFSSG).** Kenya Short Rains Assessment Report. *Consolidated Inter-Agency Report .* 2005 ; **5** : 29

5. **Mukui J T.** Situation Analysis and Community Consultations in the Nutrition Sector in Kenya (*Volume I: Situation Analysis; Volume II: Summary of the District and Community Consultations*), Report prepared for the Ministry of Planning and National Development and UNICEF-Kenya, Nairobi. 2003.

6. **Abubakar A, Holding P, Mwangome M, & Maitland K.** Maternal perceptions of factors contributing to severe under-nutrition among children in a rural African setting. *Rural and remote health.* 2011; 11: (1) 1423.

7. **Were A R, Kioli F N, Onkware K, Onyango E O, Gumo S, & Ouma C.** Factors in the management of feeding in nursery school children as perceived by their mothers in rural Bondo County, Kenya. *BMC international health and human rights* .2013; 13:(**1**), 1.

8. **Oniang'o R, & Komokoti A**. Food habits in Kenya: The effects of change and attendant methodological problems. *Appetite*. 1999; 32: (1) 93-96.

9. **Oroegbu P.** Healing insanity: Skills and expert knowledge of Igbo healers. *African Development.* 2005;30(3)78-92

10. Kilifi data secondary review/ pre- crisis. *UN OCHA.2014*

11. **Kenya Inter Agency Rapid Assessment** .*UN OCHA .2014*

12. **Kilifi County Integrated Development Plan. 2018-2022**

13. **Ritchie J** and **Lewis J**. *Qualitative research practice.* A guide for social science students and researchers. *Thousand Oaks CA: Sage.* 2003; 77-108

14. **Byrd-Bredbenner C & Wardlaw G M**. Wardlaw's perspectives in nutrition *(8th ed., International student ed. Dubuque, IA. McGraw-Hill.*2009.

15. **Marangoni F, Cetin I, Verduci E, Canzone G, Giovannini M, Scollo P. …Poli**. A Maternal Diet and Nutrient Requirements in Pregnancy and Breastfeeding. An Italian Consensus *Document. Nutrients.* 2016; 8: (10), 629.http://doi.org/10.3390/nu8100629

16. **Ministry of Health. (2011).** Rapid qualitative assessment beliefs and attitudes around infant and young child feeding in Kenya.

17. **Klaver W** and **Mwadime R**. (2000). Food consumption and nutrition

18. **Sehmi J.K**. National food composition tables and the planning of satisfactory diets in Kenya: Government Printer. 1993

19. **Mwadime R K 1, Muita J.W. Omwega A.M** and **Havemann K.** Dietary considerations in designing nutrition intervention programmes in rural areas of Kenya. Department of Food Technology and Nutrition, University of Nairobi, *Kenya. East Afr Med J.* 1995; Jul: 72(7):442-8.

20. **GOK - UNICEF.** Socio-cultural profile of the Digo and Duruma communities, Kwale District, Implications for development. Ministry of Gender Sports, Culture And Social Services. *Department Of Culture. November* 2004; 7:29-3

21. **Oniang'o R** and **Alnwick D J** .Weaning foods in Kenya: traditions and trends : International Development Research Centre(IDRC). *Kenya: Nairobi,* 1987;76 -81

22. **Kilifi District Nutrition Survey**, 2010

23. **Klaver W & Mwadime KN.** Food Consumption and Nutrition in the Kenya Coast. ASC working paper, 31, *African Studies Centre, Leiden,* The Netherlands. 1998;

24. **Bentley M., Gavin L., Black M. M** and **Teti L**. Infant feeding practices of low-income, African-American, adolescent mothers: an ecological, multigenerational perspective. *Social Science & Medicine, PubMed* .1999; 49:1085–1100

25. **Kahissay MH, Fenta T**, and **Boon H** .. Beliefs and perception of ill-health causation: a socio-cultural qualitative study in rural North-Eastern Ethiopia. *BMC Public Health. 2017*

26. **Bishaw M.** Attitudes of modern and traditional medical practitioners toward cooperation. *EMJ.* 1990; 28:63–72. [PubMed]

27. **Ekwochi U, Osuorah C D , Ndu I K, Ifediora C, Asinobi I N,** and **Eke C B**. Food taboos and myths in South Eastern Nigeria: The belief and practice of mothers in the region. *Journal of Ethnobiology and Ethnomedicine.* 2016; 12, 7. http://doi.org/10.1186/s13002-016-0079-x Gong.

28. **Hochbaum G S, Kegels,** and **Rosenstock I.** Health belief model. *United States Public Health Service,* 1952.

29. **Moore, S F. 'Law** and **Social Change**: the semi-autonomous social field as an appropriate subject of study', Law as Process: *An anthropological approach, 1*978; 56.