MATERNAL INFANT AND YOUNG CHILD NUTRITION (MIYCN) KNOWLEDGE, ATTITUDES, BELIEFS AND PRACTICES (KABP), SURVEY REPORT

MANDERA COUNTY

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Save the Children

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ACRONYMS

ASF	Animal Source Foods
CHV	Community Health Volunteer
EBF	Exclusive Breastfeeding
ENA	Emergency Nutrition Assessment
FGD	Focus Group Discussion
HH	Households
IYCN	Infant and Young Child Nutrition
KABP	Knowledge Attitudes Beliefs and Practices
KDHS	Kenya Demographic Health Survey
KNBS	Kenya National Bureau of Statistics
MIYCN	Maternal Infant and Young Child Nutrition
MoH	Ministry of Health
ODK	Open Data Kit
PPS	Probability Proportional to Size
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children's Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

The survey covered all MIYCN components. This executive summary only presents IYCN summary findings. Details of the full survey are in the report.

Introduction

Mandera County is situated in the former North Eastern Province of Kenya. Its capital and largest town is Mandera. According to Kenya Census, 2009 the county has a population of 1,025,756 and an area of 25,797.7 km². The county has six sub counties: Mandera South, Mandera West, Mandera East and Mandera North, Banisa and Lafey. According to KDHS, 2014 data stunting levels in North Eastern region was (26.4%). Additionally, North Eastern region has a higher proportion of childhood underweight (19%).

Methodology

This survey was implemented in Mandera County-wide. The target population for this survey was primary caregivers of children aged between 0 and 23 months. Both quantitative and qualitative data collection methods were used in the survey. The sample size calculation was based on the IYCF Survey calculator proposed by the step-by-step IYCF Survey guide (Care 2010), giving a sample size of 992 children aged 0-23 months.

Results

Results for key IYCF indicators are as presented below;

INDICATORS	**%**	**N**
Ever breastfed	98.2	992
Timely Initiation of breastfeeding (0-23 months)	86.1	974
Exclusive breastfeeding under 6 months (0-5 months)	68.3	442
Continued breastfeeding at 1 yr (12-15 months)	68.7	150
Continued breastfeeding at 2 yrs (20-23 months)	19.5	87

Complementary feeding indicators are shown below;

INDICATOR	**%**	**N**
Introduction of solid, semi-solid or soft foods (6-8 months)	53.2	124
Minimum dietary diversity (=<4)		
6-11 months	15.6	212
12-17 months	24.3	189

18-23 months	35.6	149
6-23 months	24.0	550
Minimum meal frequency		
6-8 months (2 times)	23.4	124
9-23 months (3 times)breastfed	30.2	242
6-23 months (combined) breastfed	14.9	550
Minimum acceptable diet		
6-8 months	6.5	124
9-23 months breastfed	7.3	242
6-23 months combined breastfed	6.2	550
Child dietary diversity		550
Grains roots and tubers	76.5	
Legumes and nuts	42.2	
Dairy	86.9	
Meats	24.0	
Eggs	16.0	
Vitamin A rich fruits and vegetables	10.4	
Other fruits and vegetables	2.2	
Consumed of Iron Fortified solid , Semi solid or soft foods	19.1	550
Cerelac	18.1	127
Plumpy Nut	17.3	
Corn Soy Blend	23.6	
Weetabix	1.6	
Quick Porridge Oats	11.8	
White oats	9.4	
At what age in months should one introduce complementary foods?		992
0-5	6.5	
6	47.0	
7 and above	46.6	
Consumed foods with added powder or sprinkles	4.0	550
Consumed LNS	11.6	550

Conclusion

Breastfeeding practices reveal; high levels of breastfeeding initiation, low use of pre-lacteals, Exclusive breastfeeding was high, but continued breastfeeding at 2 years is low. Appropriate introduction of complementary was low, overall complementary feeding indices show poor child feeding. With very low consumption of fortified foods to children.

Recommendations

There is need for interventions to address the barriers identified through the survey that inhibit optimal breastfeeding and complementary practices.

INTRODUCTION

Mandera County is situated in the former North Eastern Province of Kenya. Its capital and largest town is Mandera. According to Kenya Census, 2009 the county has a population of 1,025,756 and an area of 25,797.7 km². The county has six sub counties: Mandera South, Mandera West, Mandera East and Mandera North, Banisa and Lafey.

In Kenya, the prevalence of stunting is 26% and affects an estimated two million children (KDHS, 2014). Stunting is as a result of extended periods of inadequate food intake, poor dietary quality, increased morbidity, poverty, low maternal education or a combination of these factors. According to KDHS, 2014 data stunting levels in North Eastern region was (26.4%). Additionally, North Eastern region has a higher proportion of underweight (19%). The KDHS data on exclusive breast feeding and complementary feeding practices is available at national level but not county level. Nutrition interventions have been acknowledged as being among the most effective preventive actions for reducing mortality among children under the age of five years. Of these actions, exclusive breastfeeding ranks first; being estimated as having the potential to prevent 13 percent of all deaths in this age group while complementary feeding, water, sanitation and hygiene would reduce 6 percent and 3 percent respectively (Lancet, 2003).

With this in mind there was need for Knowledge, attitudes, beliefs and practices (KABP) survey in this county to determine the core IYCF indicators. Consequently, findings will provide information unto which program design and implementation will be developed with key focus in reducing malnutrition and improving the nutritional status in the County.

The 2016 nutrition program review has shown that current data on exclusive breastfeeding and complementary feeding practices is lacking in Mandera. The 2016 communication for development secondary data analysis and literature identified information gaps such as lack of sub-national level evidence on knowledge, attitudes, beliefs and practices in relation to appropriate feeding practices and lack of analysis on reasons for low exclusive breastfeeding in selected counties

Survey objectives

Overall, the main objective of this survey was to collect baseline information on knowledge, attitudes, beliefs and practices among caregivers and communities in the Mandera County.

This survey will be used to support UNICEF's work in nutrition, specifically by;

1. Improving our understanding of the core IYCN indicators in the context of Mandera County
2. Measuring progress and informing programmer design and implementation through application of these findings.

METHODOLOGY

This survey was implemented in Mandera County-wide. The target population for this survey was primary caregivers of children aged between 0 and 23 months. Both quantitative and qualitative data collection methods were used in the survey.

Sample size

The sample size calculation was based on the IYCF Survey calculator proposed by the step-by-step IYCF Survey guide (Care 2010). Based on the guide, the sample size for each of the eight IYCN core indicators was calculated and computed as shown in the table below:

Table 1 Estimated sample size for KABP 2017

Indicator	**Estimate**	**Precision**	**Design effect**	**Sample Size**
1. Timely Initiation of Breastfeeding (0 – 23.9 Months)	50	8%	1.5	245
2. Exclusive Breastfeeding (0 – 5.9 Months)	50	8%	1.5	245
3. Continued breastfeeding at 1 year	50	8%	1.5	245
4. Minimum Dietary Diversity (6 – 23.9 Months)	50	8%	1.5	245
5. Minimum Meal Frequency (6 – 23.9 Months)	50	8%	1.5	245
6. Minimum Acceptable Diet (6 – 23.9 Months)	50	8%	1.5	245
7. Consumption of Iron Rich or Iron Fortified Foods (6 – 23.9 Months)	50	8%	1.5	245
8. Bottle Feeding (6 – 23.9 Months)	50	8%	1.5	245

Note: There being no Mandera County-Wide specific KABP data, a prevalence of 50% was used, 50% gives optimal sample size when all other parameters are held constant

Based on the parameters above, the maximum sample size (among the eight indicators) was then selected among the indicator with the highest figure then multiplied by 4 to yield a total sample size of children aged between 0 and 23 months. As recommended by the step-by-step guide by Care (2010); the sample size is multiplied by 4 since there are 4 age categories for children 0-23 months (0 – 5, 6 – 11, 12 – 17 and 18 – 23.9). This resulted to a total sample size of 972 for Mandera County. The total sample size was then adjusted upward by a non-response rate of 2% for the final sample size as of children aged between 0 and 23 months. After the 2% attrition consideration we ended up with a sample size of 992.

Sampling procedure

The survey adopted a two stage cluster sampling survey design where Mandera County was used as the sampling frame.

- In Mandera County, the first stage sampling involved the selection of villages/clusters to be included in the survey.
- The second stage sampling was the random selection of households with children aged between 0 and 23 months from the sampled villages/clusters

Selection of clusters and households

A village which is the smallest administrative unit was deemed as a cluster. The clusters to be sampled were selected using probability proportional to size (PPS), and ENA for SMART Software used for the clusters selection. The clusters and population figures for PPS were based on the KNBS population projections from the 2009 Census. Households to be surveyed were selected using simple random sampling method. This was done using the Table of Random Numbers. Listing of households with children 0-23.9 months was done in the field, by a CHV or village elder.

The selection of households per cluster was based on a review of previous KABP) surveys that have used the MIYCN KABP tool (Homa-Bay, West Pokot, Turkana etc.). In Mandera County, an average of 16 households's per cluster were randomly selected. With 16 Households per

cluster 992/16=62 gives a total of 62 clusters. In each household 1 child under 23months of age was eligible.

N/B- Insecure villages in Mandera along the Kenya-Somalia border were excluded from sampling after consultation with the CNC and Sub-County teams.

Case definitions

Cluster- in this context villages which were the smallest administrative unit were deemed as clusters.

Household definition: refers to people who eat from the same pot and have a common household head.

IYCF Indicators

Timely Initiation of Breastfeeding – refers to proportion of children born in the last 24 months who were put to the breast within one hour of birth (0 – 23.9 Months).

Exclusive Breastfeeding- refers to proportion of infants 0–5 months of age who are fed exclusively with breast milk (0 – 5 Months).

Continued breastfeeding at 1 year- refers to proportion of children 12–15 months of age who are fed breast milk.

Minimum Dietary Diversity - refers to proportion of children 6–23 months of age who receive foods from 4 or more food groups.

Minimum Meal Frequency - refers to proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.

Minimum Acceptable Diet - refers to proportion of children 6–23 months of age who receive a minimum dietary diversity and the minimum meal frequency.

Consumption of Iron Rich or Iron Fortified Foods - refers to proportion of children 6–23 months of age who receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home.

Bottle Feeding - refers to proportion of children 0–23 months of age who are fed with a bottle.

Definition of IYCF indicators adopted from Indicators for assessing infant and young child feeding practices: Part 2 – Measurement by WHO, 2010.

Questionnaires training and supervision

Data Collection Tools

Both quantitative and qualitative data was collected. The tools were pretested prior to the actual survey data collections. This was done in sampled clusters that were not included in the main survey.

MIYCN questionnaire

An interviewer administered MIYCN Questionnaire formed the basis of the quantitative approach. The survey adopted the June 2015 Version of the MIYCN KAP Survey Tool recommended by the Nutrition Information Technical Working Group. Additional 6 questions on beliefs were accepted by NITWG for inclusion. Data was collected using ODK programmed tablets. A total of 994 households were interviewed for the Mandera KABP survey.

Focus group discussion guides

Focus Group Discussions Guides were used to facilitate the focus group discussion and collect the qualitative data. The FGDS were done separately with each FGD targeting; fathers/men, mothers of children 0-23 months, CHVs, Older women, religious and community leaders (5 separate groups). This qualitative method was used to establish perceptions on IYCN practices as well as the cultural, socio-economic, and other factors influencing these practices. Each FGD had an average of nine participants per session as conventional, with a range of six to twelve. In total, 21 FGDs were conducted. The twenty one clusters where the FGDs were done were sampled randomly from the list of clusters sampled for the baseline survey and distributed by Sub-Counties. The qualitative data was collected in their local language and later translated into English for analysis during debriefing and notes expansion sessions among the FGD teams.

Survey organization

The survey was conducted by 36 data collectors for household survey. This comprised of 10 Teams of 2 Enumerators, and a Team Leader. For the FGDs 3 teams of three members each (a facilitator/moderator, a recorder and observer) were used in collecting the qualitative data. The team leaders were all from the MoH. Supervision was done by the KABP consultant, the CNC and two survey assistants.

Training

The survey teams were trained for 4 days while FGD teams were trained for 3 days. The data was collected between 24th-30th November for both household teams and FGD teams. Piloting/pretesting was done prior to actual data collection i.e. on 23rd November and feedback and review of tools implemented. Different approaches were used in the training such; role play, question & answer session, demonstrations and use of teaching aid materials. The supervisors were also engaged in supervising the role plays and afterwards gave a feedback of each role play. Topics covered in the training included;

Household team

- Justification, objectives and methodology of the survey
- Training on survey ethics and informed consent
- Terminology translations to local language were discussed; these included colostrum, Iron Folic Acid Tablets, Fortified foods, Pregnant, Lactating, Gripe water, bottle with nipple/teat, cup with a spoon, cup with holes, health workers, nurse, auxiliary nurse, ANC Visit, community health volunteer, TBA, blood pressure measurements, antenatal drugs, tetanus vaccine, HIV test, growth monitoring, support group, corn soy blend CSB, Unimix, RUTF , IEC materials, Fortified oils, fortified maize flour, fortified oils, fortified salts, vitamin A capsule. Four groups were formed and group leaders selected for this activity. The groups interpreted the terms in Somali and Borana language.
- Training on Household survey modules.
- Age determination in complete months and years.
- Selection of the index child from households and how to identify a legible household.
- Taking a 24-hour dietary recall for the women and children and how to derive the maternal dietary diversity and child dietary diversity from the 24-hour recalls.

- Introduction to the mobile data software i.e. ODK, components of the mobile application and ways to conserve power in the field and practise of the household survey tool within the ODK.

FGD team

- The participants were introduced to the KABP survey framework, field survey ethics and consent taking.
- The roles of a moderator, note-taker and observer.
- Training on note taking and moderating skills and how to make observations during FGDs.
- Discussion of the FGD guide questions, including contextualizing some of the MIYCN terminologies.

Data management and analysis

Quality assurance of the data was done to ensure that quality data was collected. This was achieved through field supervision of the household and FGD teams, daily use of cluster control forms by household survey teams. Age determination sheets and seasonal calendars were provided to ensure that correct age was captured. The ODK program was locked to ensure a response was given before proceeding, and skip patterns activated. There was also daily ODK data monitor provided independently of the field teams, and reviews done every day to ensure completeness of data collected. Data analysis was done using SPSS version 20.0.

Data from FGDs was collected in their local language and then translated into English for analysis. Content and thematic analysis was used for sorting transcribed information, looking for patterns, similarities, differences or contradictions.

RESULTS

Household Characteristics

Majority of the interviewed households were male headed (81.4%). The respondents in the survey were women 15-49 years, primary caregivers of the index child aged 0-23months, majority were lactating (76.6%). Majority of the respondents had no education (82.3%) this is higher in comparison with North Eastern region illiteracy levels (75%) according to KDHS , 2014. On the other hand this indicates high levels of illiteracy considering the national average is 11.7% based on the 2014 KDHS report. Maternal education influences maternal decisions and is a predictor of child nutritional status (Waswa, 2015). High illiteracy has a negative implication on health, behaviors and attitudes .The region is Islamic dominated, 99.9 % of the respondents being Muslims. Majority of the respondents were housewives (53.6%) and 15.9% were pastoralists. with majority having 5-12 children (73.1%). The mean household size was 5.3 members which was higher than the national level of 3.9 (KNBS and ICF, 2015).

Table 2 Household characteristics

Women Characteristics	**%**	**N**
Sex of HH Head		992
Male	81.4	
Female	18.6	
Mean HH size	5.3	992
Physiological status		973
Pregnant	12.5	
Lactating	76.6	
Pregnant and lactating	3.9	
Not pregnant-not lactating	7.0	
Marital status		973
Currently married	96.2	
Separated divorced	2.4	
Widowed	1.4	
Single/never married	0.0	
Ever been to school	17.7	973
Highest level of education completed		172
Less than primary school	20.9	
Primary school	58.1	
Secondary/High school	16.9	
College/Pre-university/University	4.1	

Religion		973
Christian	0.1	
Muslim	99.9	
Main occupation /source of livelihood		973
Formal Employment	1.4	
Informal employment / jua kali	0.9	
Casual labor	11.9	
Own business	8.5	
Petty trading / hawking	2.4	
Pastoralist	15.9	
Dependant	1.2	
Housewife	53.6	
Other Specify	0.9	

Maternal characteristics

Almost all the respondents had ever been pregnant 99.6% and had ever given birth 97.9%. Majority of the index children were aged between 6-23months (55.4%). Child gender was almost balanced; male (50.1%), female (49.9%), with the predominant age verification means being by use of health card (53.8%) and seasonal calendar (31.0%). Majority were delivered in the home (57.1%). In comparison with KDHS 2014 results, this indicates high levels of unskilled care during pregnancy and child birth, considering a national average of 37%. However, this is a slight improvement in comparison with 2014 KDHS results for home deliveries in Mandera (61.2%). The rate of hospital deliveries is very low ,those delivered in the hospital were 36.7%, which is lower than the National level (61.2%) as indicated by the 2014 KDHs (KNBS and ICF, 2015). Skilled assistance during delivery reduces maternal and child mortality.

Table 3 Birth history

Maternal and Child Birth history	***N***	***%***
Ever been pregnant	99.6	973
Ever given birth	97.9	969
Number of children born and are alive		879
1-4	26.9	
5-12	73.1	
Age of index child in completed months		992

0-5	44.6	
6-23	55.4	
6-11	21.4	
12-17	19.1	
18-23	15.0	
12-15	15.1	
6-8	12.5	
9-23	42.9	
20-23	8.8	
Child age verification		992
Health card	53.8	
Birth certificate	4.4	
Seasonal calendar	31.0	
Other Specify (mothers recall, TBAs records)	10.7	
Child gender		992
Female	49.9	
Male	50.1	
Place of birth		992
Hospital	36.7	
Health Centre, Doctors office/private clinic	1.3	
Dispensary or clinic	1.0	
In the home	57.1	
Mid-wife home	2.8	
Other specify	0.9	

Child feeding characteristics

WHO and UNICEF have promoted increased commitment in appropriate feeding practices for all infants and young children with an aim of achieving optimal growth, development and health (WHO and UNICEF, 2004). The World Health Organization and UNICEF recommendations on breastfeeding are as follows: initiation of breastfeeding within the first hour after the birth; exclusive breastfeeding for the first six months; and continued breastfeeding for two years or more, together with safe, nutritionally adequate, age appropriate, responsive complementary feeding starting in the sixth month.

Kenya is in the fore front in meeting WHO and UNICEF requirements results indicate that majority of the children have ever been breastfed (98.2%), 68.3% were exclusively breastfed. Exclusive breastfeeding is recommended for the first six months since breast milk is safe,

available in the right temperature, requires no preparation, and is available even in environments with poor sanitation and unsafe drinking water (KDHS 2014). Therefore, breastfeeding assures babies access to a consistent, sufficient quantity of affordable and nutritionally adequate food.

Among respondents with child 0-5months of age, when asked if by the time of interview they had introduced child to anything else other breast milk were 14% , and when asked what they had introduced they reported; plain water (48.4%), soups (3.2%), other milks (33.9%), juices (0.0%), cereals (4.8%), vegetables (0.0%), fruits (0.0%), and meats (0.0%).Early supplementation has negative implications on the infants health, it reduces intake of breastmilk , exposes the infant to pathogens through contamination and also increases the risk of infections .In addition to this, in developing countries supplementary feeds are commonly nutritionally inadequate.

Early initiation of breastfeeding ensures that the infant receives colostrum which is rich in protective factors that provide natural immunity to the infant. While 94.7% of the children were fed colostrum, (12.4%) did not know the benefits of colostrum. Most of the children were breast fed less than one hour after birth (86.1%) this is high compared to the National average as compared to KDHS 2014 results (62.2%) and a 5.3% improvement in comparison with average North Eastern region results for breast feeding within one hour after birth (80.8%) according to KDHS 2014. Additionally, majority of respondents believe breastfeeding should be initiated immediately after birth (92.7%).Pre lacteal feeding is discouraged since it exposes the infant to infections as well as limiting breastfeeding frequency. Prelacteal feeding is high with 22.1% being given pre lacteals this is a 6% increase from the National levels compared to KDHS 2014 results. 77.6% of the respondents believe that infants should not be fed other drinks within first three days. However, 20.2% felt that children should be given other drinks apart from breast milk, majority felt plain water should be given (77.5%) within the first three days. The respondents who received support during the first three days after birth were 38.5%. Additionally, majority of the respondents believed children should be introduced to breastfeeding less than 24hrs after birth (91.5%).

Table 4 Breastfeeding practices among children 0-23 months of age

Breast feeding Practices	**N**	**%**
Ever breastfed	98.4	1001
Duration of breastfeeding after birth		985
Immediately	87.6	
Hours	9.2	
Days	2.8	

Don’t know	0.3	
Why child was never breastfed Baby ill Baby unable to suckle Mother unwell Mother away Inadequate breast milk Mother pregnant	 6.3 6.3 6.3 6.3 6.3 68.8	16
Feed Pre lacteals	12.9	1001
Child fed anything in first three days besides breast milk	7.6	979
In the first three days child was given milk (other than breast milk Plain water Sugar/Glucose water Sugar/Salt water Infant Formula Tea Coffee Others	 61.2 59.7 5.4 0.8 0.8 1.6 0.8 0.8	129
Reason For giving child other drinks Not enough breast milk Baby cried too much Cultural; reasons Weather too hot First milk not good Other Specify (twins, baby refused to breastfeed, mother unwell)	 58.1 18.6 10.9 12.4 1.6 20.9	129
Received practical support or advice given during first three days	48.4	1001
Baby should be put to breast immediately they are born **Baby should be given the very first milk from breast**	94.7 97.9	1001
Baby was Fed Colostrum	98.0	1001
Would feed baby on colostrum	98.6	1001
Benefits of feeding baby colostrum Nutritious to baby Prevents diseases/infections Cleans babys stomach	 74.7 45.7 6.7	981

Nothing Specific Others Specify(just like milk, only thing available, growth) Don't Know	1.7 1.3 14.1	
Reason would not feed baby on colostrum Its dirty milk Not satisfying/ sufficient Cultural practices Other	 33.3 50.0 8.3 8.3	12
Duration after birth child should be put to breast Hours Days Immediately <1hr Don't know	 90.8 7.0 2.0 0.2	1001
Should baby be given other drinks within first 3 days Yes No Don't know	 11.6 88.1 0.3	1001
If yes, what should be given; Milk (other than breast milk) Plain water Sugar/glucose water Honey Other (plain water, sugar with glucose)	 55.2 66.4 4.3 0.9 0.9	116

According to breastfeeding indicator results; timely initiation (86.1%), exclusive breastfeeding (68.3%),these indicators were higher compared to the National average as compared to KDHS 2014 results. However continued breastfeeding at 1 year (68.7%) and continued breastfeeding at 2 years (19.5%) have markedly decreased compared to KDHS 2014.

Table 5 Breastfeeding indicator among children 0-23 months

INDICATORS	**%**	**N**
Ever breastfed	98.2	992
Timely Initiation of breastfeeding (0-23 months)	86.1	974
Exclusive breastfeeding under 6 months (0-5 months)	68.3	442
Continued breastfeeding at 1 yr (12-15 months)	68.7	150
Continued breastfeeding at 2 yrs (20-23 months)	19.5	87

During FGDs the following was summarized findings from the discussions;

EBF attitudes, perceptions and practices

- Perception of inadequate breast milk by some women
- Cultural practices promoting giving of some pre-lacteals
- Some believe water is essential to cool the baby, as breast milk is warm
- Some introduce goat milk and porridge early
- Household chores and casual labor lead to others introducing other foods early as they go to search for water or food.
- Some know the importance of exclusive breastfeeding.

"They don't have time to breastfeed as they are busy with household chores" FGD Men.

" A child who is not given milk and water will not grow healthy"Older women.

"She take care of animals so she don't have time to practice exclusive breast feeding'' Older Women.

"A child who is exclusively breastfed will crawl earlier that the others"Older women.

"I was alone at home and I had to breastfeed ,eat proper food and take care of the farm and animals and all I did was take care of the child and eat late in the night," FGD Younger women.

"The child will be dehydrated since the breast milk is concentrated and will make the drain of the child dry up," older women.

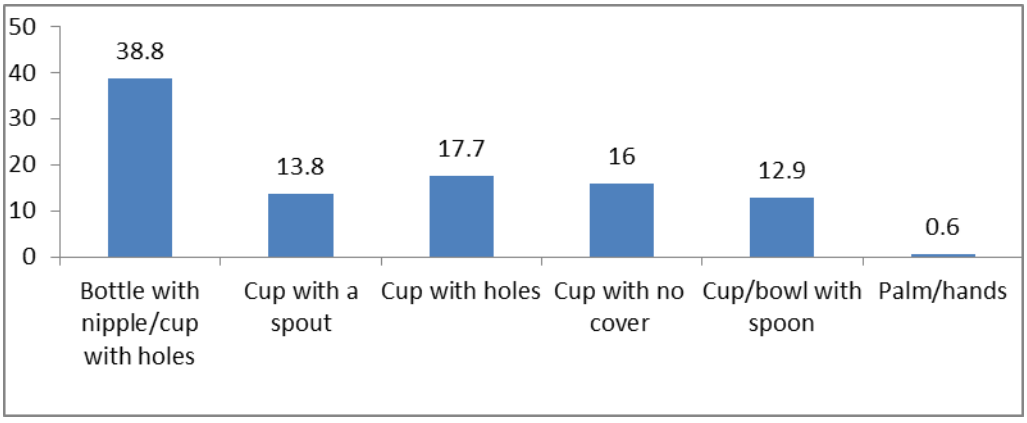

Figure 1 Use of container for drinking (N=549)

Slightly over half (55.3%) of babies (0-23 months) drank from a container on the night preceding the survey. Most commonly used container is bottle with nipple or holes (38.8%), it is also the highest in terms of what the respondents believe should be used (46.6%), yet it is not the recommended container (cup with no cover or bowl and spoon is ideal).Use of containers with teats, spout, palm and gourd is a source of contamination and safety hazard to the child.

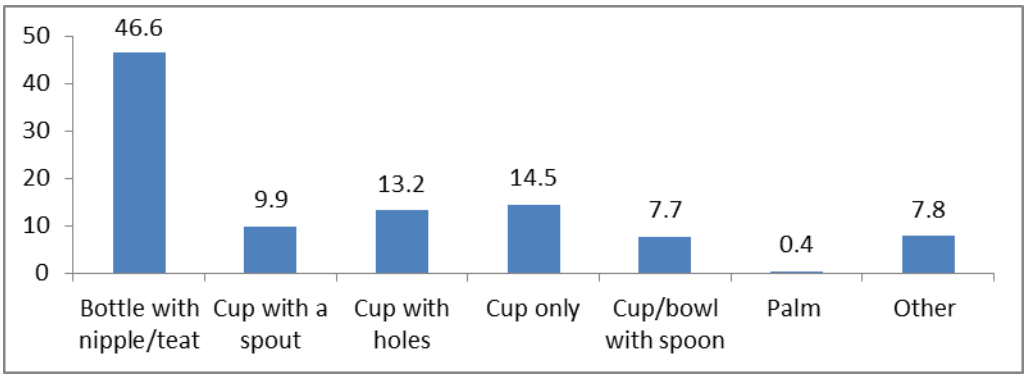

Figure 2 Ideal container for feeding liquids (N=992)

Close to half of the respondents did not receive child feeding information (42.8%).Caregivers who lack knowledge are not able to make best use of available food resources (Inayati *et al.*, 2012). Similarly, studies have also shown positive effects of nutrition education interventions on the caregivers' knowledge, complementary feeding practices and child growth (Maggie *et al.*, 2010; Shi *et al.*, 2010; Waswa, 2015).Those who received child feeding information being mostly from their mother or mother in law (51.5%) and from the CHV (46.6%). This implies that most mothers receive information from unskilled sources rather than Health care workers (5.9%) who are more skilled. Despite the fact that majority of the primary caregivers did not receive child feeding information, the main decision maker in terms of child feeding was the baby's mother (94.8%). Health care workers need to educate mothers on child feeding practices which will have an impact on child feeding attitudes, practices and child health.

Table 6 Complementary feeding characteristics

Introduction to solids, semi solids or soft foods		
	%	N
Received child feeding information	42.8	992
Source of child feeding information		425
Mother/ Mother in law	51.5	
Father/father in-law	4.2	
Other relative	3.8	
Neighbor/friend	2.1	
House girl	0.5	
Sibling	0.5	
Health Worker	5.9	
Community Health Volunteer		

Electronic media Others Specify (NGO outreach)	46.6 0.5 0.9	
Who mainly decides what the baby should and should not eat Baby's mother Baby's father Baby's grandmother House girl Day care centre Other	 94.8 2.8 1.9 0.3 0.1 0.1	992

Ensuring adequate nutrition during complementary feeding is a global health priority (Dewey, 2013). Despite the global efforts and initiatives placed in ensuring that children meet their nutrient requirement and attain optimal growth and development (Ruel *et al.*, 2013), developing countries still loom with inadequate feeding practices among the infant and young children.

The transition period from exclusive breastfeeding to consuming a wide range of foods in addition to breast milk generally between (6-24 months) is considered as complementary feeding period (Dewey, 2013). In developing countries, this period is marked by significant growth faltering ,high occurrence of infections which increases nutritional needs, hence, inappropriate feeding practices during this period are known to impact child nutrition, health and overall development negatively (Dewey 2013 ;Waswa 2015).

In this survey, appropriate introduction of complementary foods (6-8 months) was practiced by most of the respondents (53.2%). However, is low in comparison to the national level (80%) according to KDHS 2014. UNICEF and WHO recommend that solid and semi-solid foods should be introduced at around the age of six months since during this period; breast milk alone is inadequate to maintain the child's optimal growth. 46.6% believe foods should be introduced at 7 months and above.

Complementary feeding attitudes, perceptions and practices

Findings from FGDs indicate that;

- Child feeding information is disseminated by CHVs.
- Some know the importance of appropriate introduction of complementary feeds.
- Inapropriate feeding practices due to lack of money and mothers being away mostly.

"*We do complimentary feeding from 6 months even though we believe young infants get sick if started for food*"Older women.

"Breast feeding alone is not enough for the baby. I give him water 5 times a day" Older women.

Table 7 Complementary feeding practices

Complementary feeding practices		
Introduction of solid, semi-solid or soft foods (6-8 months)	53.2	124
Minimum dietary diversity (=<4)		
6-11 months	15.6	212
12-17 months	24.3	189
18-23 months	35.6	149
6-23 months	24.0	550
Minimum meal frequency		
6-8 months (2 times)	23.4	124
9-23 months (3 times)breastfed	30.2	242
6-23 months (combined) breastfed	14.9	550
Minimum acceptable diet		
6-8 months	6.5	124
9-23 months breastfed	7.3	242
6-23 months combined breastfed	6.2	550
Child dietary diversity		550
Grains roots and tubers	76.5	
Legumes and nuts	42.2	
Dairy	86.9	
Meats	24.0	
Eggs	16.0	
Vitamin A rich fruits and vegetables	10.4	
Other fruits and vegetables	2.2	
Consumed of Iron Fortified solid , Semi solid or soft foods	19.1	550
Cerelac	18.1	127
Plumpy Nut	17.3	
Corn Soy Blend	23.6	
Weetabix	1.6	
Quick Porridge Oats	11.8	
White oats	9.4	
At what age in months should one introduce complementary foods?		992
0-5	6.5	
6	47.0	
7 and above	46.6	
Consumed foods with added powder or sprinkles	4.0	550
Consumed LNS	11.6	550

Consumption of diverse diets is linked to reduction in stunting (Darpheak *et al.*, 2013). Among all age groups (only 6-23 months) only 24.0% received a minimum dietary diversity, 14.9% of them attained a minimum meal frequency and 6.2% of them realized the minimum acceptable diet. Further their diets mainly consisted of grains & tubers (76.5%), dairy products (86.9%) and their consumption of the fortified foods was equally poor (19.1%).

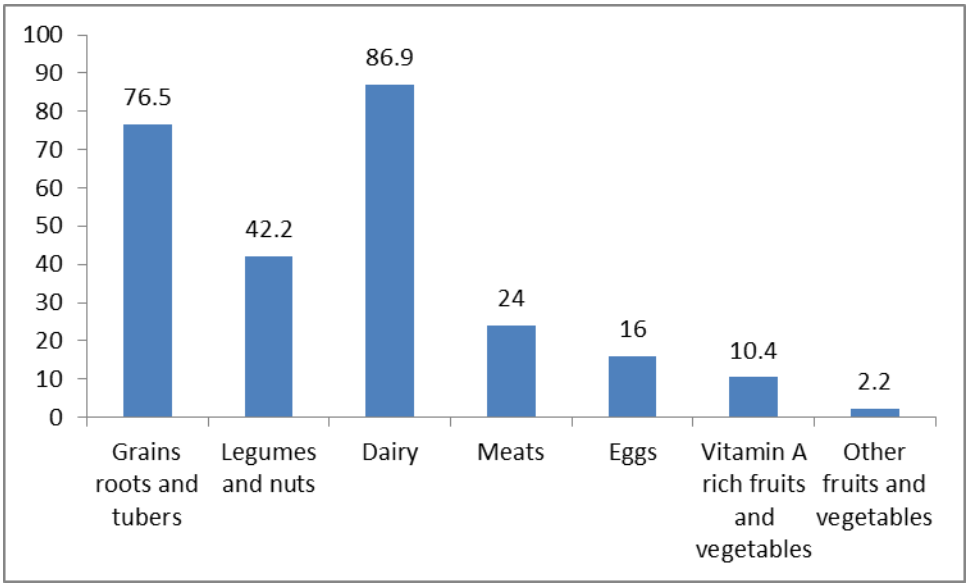

Figure 3 Child dietary diversity (N=550)

Responsive feeding and feeding a sick child are among the best practices when it comes to child feeding. It has been documented that feeding practices more so responsive feeding influence acceptance of food, dietary intake and overall growth of infants and young children (Bentley *et al.*,,2011; Black and Aboud, 2011) ; Eshel *et al.*,, 2006). Feeding children slowly and patiently and encouraging them to eat without forcing is recommended (Dewey, 2015). In line with the recommended responsive feeding practices, high proportion of respondents did something to encourage a child to eat (64.5%) by encouraging a child verbally (79.0%).

During illness fluid and nutrient intake should be increased to cater for increased nutrient needs related to nutrient losses from fever, diarrhea or vomiting (Dewey,2015). Despite most children ever being sick (57.1%), during sickness period majority of caregivers gave less breast milk (81.6%) and less food (70.5%) because child did not want it. However, after illness on average majority gave more food (53.8%) thus increasing nutrient intake to make up for nutrient losses

and allow for catch-up growth .However there is a high risk of delayed recovery for the 21.5% who gave same amounts and 21.7% who gave less amounts of food.

Table 8 Responsive feeding of children

Responsive feeding yesterday		
Respondent fed the child yesterday	93.8	550
Child ate all food you think he/she should	53.1	550
Respondent did anything to encourage child to eat	64.5	516
What respondent did to encourage child to eat;		333
Offered another food/liquid	24.3	
Encouraged verbally	79.0	
Modeled eating	3.3	
Ordered strongly	3.6	
Another person helped feed child	3.0	
Another form of encouragement	6.9	
Said something to encourage child to eat	61.6	516
Ordered child to eat	2.5	318
Praised child	78.6	
Asked child questions	5.5	
Talked about food	15.1	
Told child that she liked food	8.5	
Talked about other things	0.9	
Child self-fed yesterday at any time	40.2	550
Duration of self-feeding		550
All the time	30.3	
Half of the time	39.4	
Little bit of time	28.5	
Does not know	1.8	
FEEDING A SICK CHILD		
Child ever been sick	72.0	550
Breastfeeding practices last time child was sick		396
Less because child did not want it	81.6	
Less because it was mothers decision	1.3	
More	1.5	
Same	10.9	
Not breastfed	4.5	
Don’t know	0.3	

Non-breast milks and other liquids in sickness		396
Less because child did not want it	83.8	
Less because mother's decision	3.8	
More	1.8	
Same	8.6	
Never fed on non-breast milks and other liquids	1.8	
Don't know	0.3	
Amount of food during illness		396
Less because child did not want it	70.5	
Less because mother's decision	4.5	
More	2.5	
Same	14.1	
Never	7.8	
Don't know	0.5	
Feeding after illness food given		396
Less because child did not want it	19.4	
Less because mother's decision	2.3	
More	53.8	
Same	21.5	
Don't Know	3.0	
How often food remains on the plate		451
Most of the times/always	14.4	
Often/several times	21.1	
Few times/once in a while	48.1	
Never	16.4	
Food that remains on the plate;		550
Put in fridge	1.1	
Put in the cupboard	4.8	
Put elsewhere	11.4	
Thrown away	31.6	
Given to other children	48.0	
Other Specify (given to animals, child not taking food, mother eats)	3.2	
Duration mother is away from baby		550
Always/most days(6 days/week)	2.4	
Often/many days (4-5 days/week)	1.6	
Sometimes (2-3days/week)	14.5	
Never (0-1 days/week)	81.5	
Seen/ heard of MNPS (shown satchet)	21.1	550

Place first heard of MNPs		116
Health staff of health facility/clinic	63.8	
Community Health volunteers	25.9	
Community members	5.2	
Other family member	3.4	
Other (outreach)	1.7	

Micronutrient deficiency is a major contributor to childhood morbidity and mortality (KNBS and ICF, 2015). Sprinkles is an intervention that was developed to address micronutrient deficiencies through delivering iron and a blend of other essential vitamins and minerals in powdered form that can be mixed into complementary foods before serving(Zlotkin *et al.,* 2005). Despite micronutrient supplementation being one of the key primary health interventions to alleviate micronutrient deficiencies, low levels were reported in micronutrient supplementation from the survey, where less than a quater (21%) of the respondents had ever seen or heard about MNPs even after being shown a sample. Additionally, Only 7.1% reported receiving MNPs in the last 6 months. Of the respondents who never received MNPs, majority lack knowledge on MNPs (71.1%).

Table 9 Micronutrient powder use

Received MNP in last six months	7.1	550
Place received MNP		39
Bought from shop or chemist	2.6	
Free from health facility	69.2	
Bought from health facility	2.6	
From CHV	25.6	
Frequency of giving MNP		39
Every day	28.2	
Every other day	20.5	
Every third day	12.8	
Two days a week at ay day	7.7	
At any day when she remembers	15.4	
Can't remember / don't know	15.4	
Preparing food with MNP		39
Cook with child's food	20.5	
Mix with cooked solid/semi-solid food that is still warm	61.5	
Mix with water	5.1	

Mix with childs drinks Other	10.3 2.6	
Quantity of food mixed with MNP All amount prepared for child Quantity that child can eat once Other	 12.8 84.6 2.6	39
Reason never received MNP Does not know about MNP Discouraged from what I heard from others Child has not fallen ill so haven't gone to a health facility Health facility or outreach is far Child receiving therapeutic or supplementary/foods I was not offered MNPs at the health facility Other specify (under 6months of age, don't want)	 71.1 4.1 6.9 5.0 1.9 8.6 9.7	927

Maternal health and nutrition characteristics

Maternal health characteristics and practices were captured for currently pregnant women as well for the respondent during her pregnancy with the index child. The results are presented separately below.

ANC is an important strategy to improve maternal and infant health, however literature indicates that in Sub-Saharan Africa, women mostly initiate ANC after the first trimester and do not achieve the recommended number of ANC visits (Pell *et al.*, 2013). Among currently pregnant women aged 15-49 years, majority started ANC between 3rd to 5th month (67.8%), with majority having between 1 and 4 visits (91.6%). WHO recommends a minimum of four antenatal visits during each pregnancy (WHO, 2001). The main source of ANC care was from public hospital (42.7%), provided by nurses/mid-wives (80.2).

Among the predominant ANC services received, mosquito net17.7%, Deworming (45.8%) and anti-malarias (36.5%) were the least provided. While overall all essential health and nutrition information was given by nurses (77.1%).

Table 10 Maternal health characteristics and practices

Maternal Health		
Seen for ANC during this pregnancy	60.0	160
Months pregnant when 1st attended ANC **1** 2 3	 4.2 9.4 16.7	96

4	29.2	
5	21.9	
6	13.5	
7	4.2	
8	1.0	
Times received ANC for current pregnancy		96
1	15.6	
2	20.8	
3	32.3	
4	22.9	
5	4.2	
6	2.1	
9	1.0	
Don't know	1.0	
Where received ANC for current pregnancy		96
Home	3.1	
Public hospital	42.7	
Public health centre	28.1	
Public dispensary	24.0	
Otherpublic health sector	1.0	
Nursing /maternity home	1.0	
Who did you see		96
Doctor	5.2	
Nurse/Mid-wife	80.2	
TBA	2.1	
CHV	11.5	
Other Person	1.0	
ANC services received from current pregnancy		96
Weight taken	87.5	
BP	77.1	
IFAS	69.8	
Anti-malarials	36.5	
Urine sample taken	68.8	
Blood sample taken sugar/hb	72.9	
Tetanus vaccine	70.8	
Deworming	45.8	
HIV test	54.2	
Mosquito net given	17.7	
MUAC measured	59.4	
Information given during ANC vsit current pregnancy		96
Tests during pregnancy		
Birth planning	67.7	
Place of delivery	38.5	
Own health & hygiene	64.6	
Own nutrition	56.3	

HIV/AIDS	62.5	
Breast feeding	42.7	
Infant feeding	62.5	
IFAS	45.8	
Growth monitoring	62.5	
	38.5	
Source of the information		96
Doctor	4.2	
Nurse	77.1	
TBA	2.1	
Relative	1.0	
CHV	29.2	
NGO/CBO	2.1	
Other (outreach)	3.1	
ANC practices		
Attended ANC (Index child)	73.8	992
Months pregnant during 1st ANC visit		732
1	3.7	
2	6.8	
3	18.2	
4	36.2	
5	18.6	
6	9.3	
7	5.7	
8	1.4	
9	0.1	
Times received ANC		732
1	10.7	
2	17.9	
3	28.4	
4	29.1	
5	10.4	
6	2.0	
7	0.3	
8	0.1	
9	0.3	
DK	0.8	
Information given during ANC visit during index child pregnancy		732
Tests during pregnancy	69.7	
Birth planning	46.6	
Place of delivery	74.3	
Own health & hygiene	64.1	
Own nutrition	67.9	
HIV/AIDS	55.5	

Breast feeding Infant feeding IFAS Growth monitoring	69.9 53.4 64.8 43.7	
ANC services received during index child pregnancy Weight taken BP IFAS Anti-malarials Blood sample taken Urine sample taken Tetanus vaccine Deworming HIV test Mosquito net given MUAC measured	 78.0 78.6 68.9 41.5 72.8 79.1 84.6 45.6 59.0 16.3 52.2	732
Reasons for not attending ANC index child pregnancy; Not aware of existence or importance Health facility too far Unfriendly health care workers TBA services inadequate Cultural barriers Other (Nurses strike, away in bush, felt well)	 40.8 90.8 0.8 11.2 10.0 11.2	260
Post-natal care practices		
Time it took to take child to clinic for first the time Imediately (within 24hrs) Within first 2 weeks Between 2 weeks and 1 month After 1 month Child not taken Don't intend to	 11.3 13.1 8.2 45.5 19.3 2.6	611
Duration after delivery mother seen by a healthcare worker Immediately (within first 24 hours) Within first two weeks Between 2 weeks and 1 month After 1 month Not seen	 9.7 4.3 14.2 43.0 28.8	611
Place of Child delivery At home by TBA At home by nurse At home without assistance	 57.2 1.5 4.1	949

Hospital Other	35.6 1.6	

Majority of the respondents attended ANC visits for the index child than the current pregnancy. Among respondents to the index child, overall majority ever attended ANC (73.8%), most attended between the 3rd and 5th month of pregnancy (73%), whereas majority received between 2 to 4 ANC visits (75.4%). 42.2% achieved the recommended 4 and above number of ANC visits.

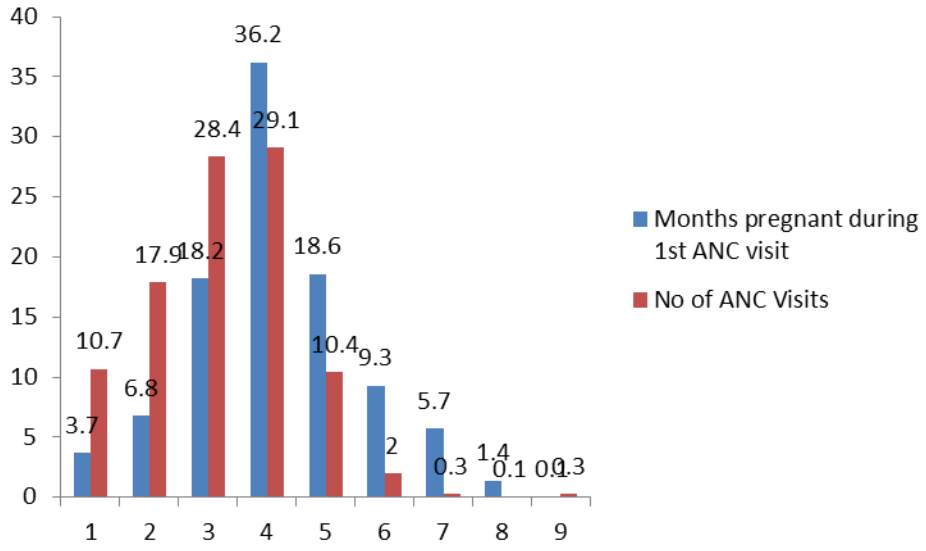

Figure 4 First ANC visit and number of visits (N=732)

During ANC visits essential information given was to more than 60% of the respondents except Birth planning (46.6%), Growth monitoring (43.7%), HIV/AIDS (55.5%), Infant feeding (53.4%) which were the least provided information. All essential services given reached over 50% of the respondents, with the least provided services being deworming (45.6%), anti-malarial (41.5%) and mosquito nets (16.3%).

Distance to the health facility (90.8%) and not being aware of existence of the services (40.8%) were the most cited reasons.

Generally, information and services given in current pregnancy were lower compared to previous pregnancies with the index child.

Community perception of ANC

- ANC services such as treating infections, foetus is assessed, tetanus vaccine, urine test, blood pressure, IFAS and child's status is known.
- Some claim there is no need to visit the hospital not unless they are sick.
- Household chores such as taking care of their animals is more important than going to hospital.

"*Some say they cannot go to hospital for fear of their sons who are nurses to see their nakedness"* CHV's FGD.

"*I normally go for ANC for the safety of my child and my health*," Younger women FGD.

Hospital delivery which is a key maternal and child mortality and morbidity strategy is highly encouraged and supported through different initiatives, such as the free maternity government program. A significant proportion of mothers in developing countries still deliver at home unattended by skilled health workers (Montagu *et al.*,,2011; Koblinsky *et al.,* 2006). Unskilled deliveries were high among the respondents; 57.2% delivered at home by TBA. This is quite high in comparison to the national levels according to KDHS 2014. Literature agrees that qualified skilled personnel manage labor complications effectively and are equipped with effective referral systems for specialized care during complications thus improving perinatal outcomes for mothers and infants (Fillipi et al 2006; Gabrysch and Campbell, 2009, Adegoke and Broek, 2009; Koblinsky et al 2006). Hospital deliveries (35.6%) are very low in Mandera county in comparison to national levels according to KDHS 2014.

Some of the important barriers to delivering in health facilities in Kenya include physical access to health facilities through distance ,lack of transport and economic considerations (Mandera *et al*, 2013).

Home deliveries are highest, with low skilled birth attendants. During FGDs the following summary came up;

- Presence of experienced TBAs in the home
- If staff is welcoming they would attend
- Presence of male nurses is discouraging
- Fear of cesarean section associated with hospital delivery
- If no complications some of them prefer to deliver at home

"*They do not allow their women to deliver in hospital because facilities lack female nurse"*CHV FGD.

The postpartum period is critical for the mother and child since during this period there is high risk of developing complications (KDHS 2014).The period with the highest risk during obstetric period is the first 48hours after delivery where majority of maternal deaths occur due to excessive bleeding. PNC care within the first 48hours after delivery is essential. Only 11.3% of the respondents took child to clinic for the first time during the critical two day period. This is very low in comparison to the national average of (53%) in comparison to KDHS 2014. Majority attended PNC for the first time after one month (45.5%). According to regional results for KDHS 2014, North eastern region is marked by high rates of no postnatal checkup (80%) , there is a great improvement in PNC attendance whereby only 19.3% did not attend clinic. Additionally, (43.0%) of the respondents were seen by a health care worker one month after delivery while 28.8% were not seen at all.

PNC FGD discussions revealed that;

- Women take children only for vaccination mostly
- Only attend when there are complications
- Some women are not aware of PNC.

"*We always educate them on the need of PNC but they say its not necessary and we are forced to look for them in their home which is also cumbersome for us*" CHV FGD.

"*We take our children for clinic because we know the importance of PNC "* Men FGD.

Facility factors promoting health service utilization

- Availability of drugs
- Vaccinations given
- Incentives like nets
- Positive staff attitude
- Staff are welcoming and cooperative

Factors discouraging health service utilization

- Drug stock outs at times
- Distance to health facility
- Male staff attending to women
- Unfriendly health care workers
- Lack of maternity wing at some health facility
- Lack of female staff
- Poverty

"*They do not allow their women to deliver in hospital because facilities lack female nurse"* CHV FGD

*"I cannot permit my wife to visit the hospital as i cannot allow men attending to her"*Men FGD.

"We believe God cures and so why waste time to go to hospital which has no drugs when we can read Quran for medication," Younger women FGD.

"*You have to pay fifty shillings of which sometimes you cannot get tested*." Younger women FGD.

"Recently I saw 3 donkey carts carrying children to hospital (7kms distance)"Leaders FGD.

Micronutrient supplementation

There is a causal link between maternal Iron Deficiency Anemia and adverse birth outcomes including low birth weight and increased perinatal mortality; there exist a substantial proportion of neural tube defects related to inadequate consumption of folic around the time of conception (Black et al, 2013). Among currently pregnant women, less than half had heard or seen IFAS (42.5%) .Folic acid was consumed by a majority of respondents supplemented (73.5%).

All women who received IFAS supplements none consumed all the supplement tablets issued.

Slightly less than half of the respondents know benefits of IFAS (47.9%). Those who know the benefits of IFAS stated that IFAS increases blood(57.3%) and prevents anemia in pregnant women(66.1%). 20% had IFAS at home but did not take mainly because they forgot (32.1%). 28.8% consumed fortified blended flours, 7.5% consumed RUSF while 7.5% were consuming soil/mineral salts even though deworming was one of the least provided ANC services.

Table 11 Maternal IFAS supplementation

Supplementation and delivery		
Heard, seen or received information about IFAS (current pregnancy)	42.5	160
First source of information on IFAS(current pregnancy		565
Health staff or health facility/clinic	87.4	
Community Health Volunteer	20.0	
Community members	4.4	
Friends/support groups	1.8	
Husband/male partner	0.4	
Other family members	2.0	
Currently taking supplements(current pregnancy)		68
Iron Tablets/ syrup	67.6	
Folic acid	73.5	
Combined Iron and folic	54.4	
Quantity of supplements given(current pregnancy)		46
Iron Tablets		
Total given		
1	4.3	
2	2.2	
7	4.3	
14	2.2	
25	2.2	
30	82.6	

90	2.2	
Folic acid		50
Total given		
1	2.0	
2	2.0	
5	2.0	37
7	4.0	
10	4.0	
18	2.0	
20	4.0	
28	2.0	
30	78.0	
Combined Iron and folic		
Total given		
2	2.7	
5	2.7	
7	2.7	
30	91.9	
Consumed supplements from total given(current pregnancy)		46
Iron Tablets		
0	4.3	
1	4.3	
2	2.2	
7	4.3	
10	2.2	
20	4.3	
23	2.2	
30	76.1	
Folic acid		50
0	2.0	
1	4.0	
2	2.0	
5	2.0	
7	4.0	
10	8.0	
12	2.0	
14	2.0	
15	4.0	
16	2.0	
20	2.0	
30	66.0	

Combined Iron and folic		37
2	2.7	
5	2.7	
7	2.7	
14	2.7	
15	2.7	
20	2.7	
21	2.7	
25	2.7	
28	2.7	
30	75.7	
Know benefits of taking IFAS in pregnancy	47.9	992
Benefits of taking IFAS during pregnancy		475
Prevents anemia among pregnant women	66.1	
Prevents dizziness	10.1	
Increases blood	57.3	
Helps development of fetus	6.7	
Improves immunity	7.2	
Increases energy	7.4	
Other Specify (increases concentration)	0.6	
Had IFAS supplements at home but did not take	20	160
Reasons for not taking IFAS supplements(current pregnancy)		504
Forgot	32.1	
Side Effects	6.2	
Felt better and I did not think I needed any more	3.2	
Did not know how long to take	1.2	
Did not know the benefits	1.8	
Other (taste awful, and smell not good)	0.6	
Currently consuming (current pregnancy)		160
CSB, Advantage plus, Unimix	28.8	
RUSF	7.5	
Herbal	0.6	
Soil/Mineral Stones	7.5	

Among primary caregivers to the index child, 57.2% had heard or seen IFAS, with 52.3% issued with IFAS at ANC, mostly folic (66.5%). This indicated a reduced intake hence interventions should target adherence in supplementation.40.1% had IFAS at home but did not take mainly because they forgot (80.2%). Slightly less than half of respondents reported they knew benefits of IFAS (47.9%). 32.5% consumed CSB/Advantage plus/ Unimix while those who consumed soil/mineral salts were 4.7% despite deworming being among the least provided services.

Table 12 IFAS supplementation during most recent pregnancy

Heard, seen or received information about IFAS (index child pregnancy)	57.2	992
First source of information on IFAS (index child pregnancy)		565
Health staff or health facility/clinic	87.4	
Community Health Volunteer	20.0	
Community members	4.4	
Friend/support groups	1.8	
Husband/male partner	0.4	
Other family member	2.0	
IEC	0.2	
Issued with supplements during pregnancy (index child pregnancy)	52.3	992
Supplements Given (index child pregnancy)		519
Iron Tablets/syrup	38.5	
Folic acid	66.5	
Combined Iron and folic	56.8	
Quantity of supplements given(index child pregnancy)		
Iron Tablets/syrup		200
Total given		
1	1.0	
2	0.5	
4	0.5	
6	0.5	
7	4.0	
10	1.5	
13	0.5	
14	2.0	
15	2.5	
20	3.0	
23	0.5	
25	0.5	
30	81.0	
38	0.5	
40	0.5	
60	0.5	
120	0.5	
Folic acid		345
Total given		
1	0.3	
2	0.6	
6	0.3	

7	3.2	
10	1.7	
14	1.4	
15	3.2	
20	2.0	
21	0.6	
23	0.3	
25	0.3	
28	0.3	
30	84.6	
35	0.3	
38	0.3	
40	0.3	
60	0.3	
Combined Iron and folic		
Total given		295
1	0.3	
2	1.0	
6	0.3	
7	2.4	
15	2.0	
20	1.4	
30	86.4	
38	0.3	
40	0.7	
60	4.4	
120	0.3	
180	0.3	
Consumed supplements (index child pregnancy)		
Iron Tablets		
0	1.0	200
1	2.0	
4	0.5	
5	0.5	
6	0.5	
7	5.0	
10	1.5	
13	0.5	
14	1.0	
15	2.5	
20	6.5	
30	77.0	
40	0.5	
60	0.5	
120	0.5	

Folic acid		
0	0.3	
1	0.6	345
2	0.3	
3	0.3	
6	0.3	
7	4.1	
10	2.3	
14	1.7	
15	3.5	
20	4.1	
21	1.2	
23	0.3	
25	0.9	
28	0.3	
30	79.4	
35	0.3	
60	0.3	
Combined Iron and folic		295
1	0.7	
2	0.7	
6	0.3	
7	3.1	
15	2.0	
20	2.4	
21	0.3	
25	1.0	
26	0.3	
30	84.4	
38	0.3	
40	1.0	
60	2.7	
120	0.3	
180	0.3	
Know benefits of IFAS	47.9	992
Benefits of IFAS during pregnancy		475
Prevents anemia among pregnant women	66.1	
Prevents dizziness	10.1	
Increases blood	56.6	
Helps development of fetus	6.7	
Improves immunity	7.2	
Increases energy	5.3	
Improves concentration	0.6	
Had IFAS at home but did not take	40.1	504

Reasons for not taking IFAS supplements (index child pregnancy)		
Forgot	80.2	
Side Effects	15.3	
Felt better and I did not think I needed any more	7.9	
Did not know how long I should take the tablets	3.0	
Do not know benefits of IFAS	4.5	
Other (smell, taste)	1.5	
Currently consumes (index child pregnancy)		992
CSB, Advantage plus, Unimix	32.5	
RUSF	9.8	
Herbal Supplements	2.1	
Soil/Mineral Stones	4.7	

Community perceptions about IFAS from FGDs

- Some know the benefits of IFAS.
- Some believe IFAS is a form of family planning.
- The side effects are a common challenge such as nausea, bad smell, vomiting
- They are unavailable in the facilities at times
- Some of the participants in FGDs reported awareness of the benefits of IFAS.
- Some belief IFAS can cause more illness.
- Most believe IFAS boosts blood levels.
- Some don't complete full doze.
- Some believe IFAS boosts appetite and is a concern for some families that have inadequate food resources.
- Some believe in faith healing.

*"A mother claimed that she had never in her entire life taken a drug and she says she is quite healthy"*CHV FGDs.

*"During my time I never took any supplement and nothing happened to them, but these days things are different and I hear it is a good thing and I always tell my daughter to take the medicine"*older women FGD.

"I used to eat iron folate supplement and all I could do is sleep all the time," Younger women.

"Why my wife to take medicine when she is not sick." Men FGD.

'When my daughter took the supplement when she was sick and couldn't stand. It helped regain her energy" Older women FGD.

"We survived without those drugs for many years and we didn't require it." Younger women FGD.

Food fortification

Inadequate micronutrient intake is of concern for infants and young children in developing countries (Walton et al, 2012). The use of fortified products is a wide reach strategy for preventing and alleviating micronutrient deficiencies for the general household and vulnerable groups. Slightly over a quarter households in Mandera County (28.6%) with a child aged under 2 years reported using fortified food products. The predominant products being; salt (80.9%), cooking fat/oil (56.1%) and maize flour (72.3%). These households mostly used oil (93.0%).

Majority of the respondents perceived benefits of feeding children 6-23months with fats/oils enriched with vitamins as to boost baby's immunity (40.8%), while 40.1% didn't know the benefits of feeding children with fortified oils.

Table 13 Food fortification

Fortified flours,oils and salt		
Uses fortified products at home	28.6	973
Fortified Food Products used		278
Fortified maize flour	72.3	
Fortified wheat flour	30.9	
Fortified cooking fat and oil	56.1	
Fortified salt	80.9	
Margarine	1.4	
Fortified Sugar	4.0	
Main oil/fat consumed		276
Vegetable fat	5.4	
Oil	93.8	
Other (vegetable oil)	0.7	
Respondents perceived benefits of feeding children (6-23 months) fats and oils enriched in vitamins and minerals		973
Improves ability to fight diseases	40.8	
Improves child appetite	11.5	
Improves child's ability to learn and develop	12.8	
Makes children health strong and active	21.7	
Prevents vitamin and mineral deficiencies	11.2	
Other specify	0.2	
Don't know/Don't remember	40.1	

Nutrition beliefs

A large majority of respondents do not belief that; some foods are taboo and should avoided by pregnant women (49.0%), pre-lacteals should be fed to child after birth (65.9%), colostrum is

dirty and should not be fed to young children (74.7%), it is not possible to exclusively a baby for the first six months of life (68.3%), some foods are taboo and should not be fed to young children (54.7%), and that a young child should not be breastfed up to 2 years (74.4%). However, FGD findings indicate presence of food taboos that influence consumption of certain foods during pregnancy

Table 14 IYCF beliefs among women with children aged 0-23 months

Question	%	N
Some people believe that certain foods are taboo and should not be fed to a pregnant woman		990
Agree	45.3	
Not sure	5.8	
Do not agree	49.0	
Some people believe that a new born baby should be given other liquids/Semi-solids before initiating breastfeeding		990
Agree	24.3	
Not sure	9.8	
Do not agree	65.9	
Some people believe that COLOSTRUM (that breast milk that comes out in the first 3 days after delivery) is dirty and should not be fed to new born babies		990
Agree	20.3	
Not sure	4.9	
Do not agree	74.7	
Some people believe that a baby cannot survive on exclusive breastfeeding for six months		990
Agree	23.3	
Not sure	8.4	
Do not agree	68.3	
Some people believe that certain foods are taboo and should not be fed to a child		990
Agree	36.8	
Not sure	8.5	
Do not agree	54.7	
Some people believe that a young child should not be breastfed up to 2 years		990
Agree	17.4	
Not sure	8.2	
Do not agree	74.4	

Challenges to food availability and access from FGDs include

- Poverty making it difficult for some to access all the food they would need.

- Pastoral lifestyle makes food access hard when families relocate in search of pasture
- Large family sizes make food sharing limit intake
- Distance to markets is a challenge especially during the rainy season for some areas
- Drought that precipitates food insecurity hence scarcity.
- Household chores.

"Some women belief if they eat rice, they will have less milk production," CHV FGD.
*"Egg because we belief that increase size of the foestus in the womb."*Younger women.
'Milk of cattle we belief it increase weight of the foetus in the womb." Younger women.
"We cannot allow them to take some food as it's dangerous for them " Men.

"I took rice and beans for lunch yesterday and I had a serious heartburn," Younger women.
"I was constantly vomiting during my first trimester and I couldn't eat solid food," Younger women.
"I was alone at home and I had to breastfeed ,eat proper food and take care of the farm and animals and all I did was take care of the child and eat late in the night," Younger women.

Factors influencing maternal feeding practices

- Lack of money to purchase the food
- Cultural believes.
- Sickness
- Distance to the market
- Availability of variety of foods.
- Knowledge on child feeding practices

*"We strongly advice women to eat balanced diet , although some foods are not available,"*CHV.

"I took a glass of soup yesterday in the evening and my son kept complaining about the distance," Younger women.

*"Almost 90% in this village cannot afford to buy meat since they are mostly poor"*older women

"We don't care some times what we eat because we only eat what is available." Men.

"I sent my husband to get spaghetti and all he could say is he forgot and it wasn't the first time and it forced me to eat the same type of food for two days," Younger woman.

"Camel humps contains a lot of oil hence it will interfere with growth of fetus in the womb" Men.

"After 7 months, a pregnant woman is prevented from eating food e.g. egg and meat which may enlarge the foetus" Oder women.

"Kidney is not eaten by pregnant mothers , because if harm foetus in the womb" Men.

"I took honey which lead me to miscarriage since I didn't know about it." Younger woman.

"Nobody will cook anything different for her she will take what is cooked for the family". elder woman

Health and nutrition education perspectives

During FGDs views were sort from the members regarding the status of MtMSGs and the likely approaches that could be used to strengthen health and nutrition education among Men and leaders, Women and the Community in general.

The findings are summarized below;

The status of MTMSGs

- Mothers gain knowledge on nutrition and hygiene practices.
- The community supports MTMSGs.
- Mothers support and educate each other.
- Some view it as waste of time.
- Some view MTMSGs as a room for gossip.
- MTMSGs need financial support.

"I don't have time to gossip , mother coming together only to gossip and do nothing" Older women.

"some mothers prefer to go to herd the animals early so they do not have time for such groups even if it is made" Older women.

Practical approached to enhance health and nutrition education from FGD discussions;

Targeting Men and leaders

- Providing them with fertilizers and seeds to improve their harvest.
- Sensitisation of men and leaders on importance of health and nutrition during barazas.
- Mobilisation of men and leaders to treat the children and family at health facility.
- Use of chiefs and religious leaders to communicate important message
- Involve men and leaders in decisions making.

- Banning of *miraa*-Most men in the community are *miraa* chewers they spend the money they get on *miraa* instead of their families.

- Incentives to farming and agriculture.

Approaches for Women

- Construction of markets to provide food varieties.
- Nutrition education to mothers.
- Group funding to improve livelihood through women farming projects.
- Assisted on irrigation and agriculture and alternate sources of living
- Informal radio station that endorses health and nutrition on local languages

- Maternal nutrition through mother to mother support groups.

- Involve women in the decision making on health and nutrition.
- Encouraged to attend ANC and PNC through seminars and at MCH clinic**.**
- Awareness sensitization at the market

Community approach

- Training more CHVs.
- More medicines for the dispensary.
- Drilling a borehole so that they can practice farming.
- Health education at water points e.g earpan.
- Conducting seminars so that women and men can be taught on Iron and foliate supplements as well as ANC and PNC.
- Health education through barazas.
- Community dialogues.

Maternal and child nutrition status

Maternal and child nutrition contribute to deficits in children's development, health and productivity into adulthood (Black *et al.,* 2013). While a woman's nutrition status may affect her own health it may as well have implications over her children. Despite MUAC being a rapid assessment method for nutritional status, it is still a valid method for screening; Child nutritional status indicator; based on MUAC half of the children were nourished overall (49.9%). Therefore,

half of the children are either at risk or malnourished based on MUAC screening, 36.1% were at risk, while 12.6% were moderately malnourished.

Table 15 Maternal dietary diversity child and maternal MUAC status

Maternal dietary diversity		
Food groups		**973**
Starches	98.7	
Pulses	76.3	
Nuts and seeds	1.4	
Milk and milk products	96.2	
Meats	41.0	
Eggs	27.3	
Dark green leafy vegetables	8.3	
Other Vitamin A rich fruits and vegetables	3.3	
Other vegetables	62.9	
Other fruits	3.3	
Acceptable maternal diet (5 or more food groups)	38.5	**973**
Child MUAC		**549**
Nourished (>13.4cm)	49.9	
At risk (12.5 – 13.4cm)	36.1	
Moderately malnourished (11.5-12.4cm)	12.6	
Severely malnourished (<11.5cm)	1.5	
Maternal MUAC (at 21cm cut-off)		**905**
Pregnant and lactating Acute malnutrition	9.2	
Maternal MUAC (at 23cm cut-off)		**68**
Women not pregnant not lactating acute malnutrition	35.3	

Maternal diet quality is a good indicator of overall micronutrient status and together with other factors is likely to impact their nutritional status.

Even though only 9.2% of the pregnant and lactating women were malnourished, the overall diet quality was poor with low uptake of animal sourced foods and Vitamin A rich fruits and vegetables. The predominant food groups consumed were; starches (98.7%), Pulses (76.3%), milk and milk products (96.2%) and other fruits and vegetables (62.9%). Dark green vegetables, vitamin A rich fruits and vegetables, other fruits, nuts and seeds and meats were rarely consumed therefore lack of diversified diets.Only 38.5% of the women met minimum acceptable diet (food from five food groups or more).

DISCUSION

Nutrition deficiencies are prevalent globally contributing to high morbidity and mortality rates to infants, children and mothers in developing countries. Mothers who are malnourished when children are likely to enter pregnancy stunted and their health and nutrition status will impact their children nutritional status negatively thus developing a vicious cycle. Mandera County is classified within the arid and semi-arid regions of Kenya rendering it among the counties most vulnerable to malnutrition. So as to understand the determinants of undernutrition it is important to assess causes and determinants of under nutrition at different levels as per the most widely used conceptual framework developed by UNICEF. The synergistic interaction between inadequate dietary intake and disease burden leads to a vicious cycle that accounts for much of the high morbidity and mortality in developing countries (Khan, Yasir, and Zulfiqar A. Bhutta, 2010). Data on stunting levels in North Eastern region was (26.4%); North Eastern region had a higher proportion of underweight (19%) according to KDHS, 2014. According to survey results, only half of the children (49.9%) aged 6-23 months were well nourished overall based on MUAC as a child nutritional status indicator. This could be attributed to high prelacteal feeding, low consumption of fortified foods, high household size limiting food access, low continued breastfeeding at one year.

The period of complementary feeding is between 6 and 24 months , marked by a transition from exclusive breastfeeding to consuming a wide range of foods in addition to breast milk and is the key window for preventing under nutrition and its long-term adverse implications; marked by significant growth faltering, high occurrence of infections leading to increased nutrition needs hence adequate nutrition during this critical period is prioritized (Dewey, 2013) .According to UNICEF , solid and semi-solid foods should be introduced to infants at around one six months of age because breast milk is insufficient to maintain growth. Despite high appropriate introduction of complementary feeding, high recommended responsive feeding practices majority of the women use bottles with nipples to feed their children. Bottle feeding is highly discouraged due to the possible contamination of unsafe water, lack of hygiene leading to infections. This may also reduce child's interest in breastfeeding thereby result in declined milk production (KNBS and ICF, 2015).

Responsive feeding ought to improve children's attentiveness, interest in feeding, attention to their inner cues of hunger and satiety, ability to communicate their needs to their caregivers with distinct meaningful signals and successful progression to independent feeding (Black and Aboud, 2011; Bentley *et al.,* 2011; Eshel *et al.,* 2006) hence it is a key feature in healthy caregiving behavior. Recommended responsive feeding practices were high. During illness fluid and nutrient intake should be increased to cater for increased nutrient needs related to nutrient losses from fever, diarrhea or vomiting (Dewey,2015). Even with most children ever being sick (57.1%), during sickness period half of the children were given same and less amount of food hence a risk of delayed recovery. This could be attributed to the low dissemination of nutrition knowledge from skilled sources and high illiteracy levels.

Young mothers usually find it impossible to ignore their ill-informed elders (Kruger and Gericke, 2017) .Majority of the caregivers receive child feeding information from unskilled sources mainly; their mother or mother in laws and CHVs. Caregivers might not make the best out of the food present in the household due to lack of knowledge on foods for young children, cultural beliefs and practices (Waswa, 2015). Additionally, literacy and numeracy skills that women acquire in school enhance their ability to recognize illness and seek treatment for their children (Abuya, 2012). Inappropriate feeding practices during complementary feeding period are known to impact child health negatively therefore education interventions on infant and young child feeding are a necessity.

Low utilization of health care services was evident from the survey; women mostly initiate ANC after the first trimester. Timing of first antenatal care is indeed an important entry point for delivery care as young women who initiated antenatal care early were more likely to use skilled professional assistance at delivery than their counterparts who initiated ANC late (Ochako *et al.,* 2011). achieve the recommended number of ANC visits. It is recommended that pregnant women have at least 4 antenatal visits during their each of their pregnancies so as to identify any complications forehand hence preventing maternal and child mortality (WHO, 2001). Less than half of the respondents achieved recommended number of ANC visits. From the FGDs women are aware that during ANC visit the foetus is monitored and appropriate drugs are administered. ; these are incentives to ANC attendance. However, some women report that they attend ANC only when they have labour complications , while others fail to attend ANC due to household

chores. Additionally, low timely PNC first attendance; only 11.3% of the respondents took child to clinic for the first time during the critical two day period while majority attending PNC for the first time after one month (45.5%).

Unskilled deliveries were high among the respondents; 57.2% delivered at home by TBA. Literature agrees that qualified skilled personnel manage labor complications effectively and are equipped with effective referral systems for specialized care during complications thus improving perinatal outcomes for mothers and infants (Fillipi *et al.,* 2006; Gabrysch and Campbell, 2009, Adegoke and Broek, 2009; Koblinsky *et al.,* 2006; Shiferaw et al.2013).Physical acces to health facilities because of unreliable transport and poverty are barriers to health facility deliveries (Kitui *et al.,*;2013). Qualitative discussions revealed that lack of ambulance for referrals, long distance to the health facilities, presence of experienced TBAs in the community, presence of male nurses are major barriers to health facility deliveries.Strategies to promote skilled assisted deliveries such as provision of ambulances and improving maternal experiences at the health facilities is a necessity.

Literature indicates that child under nutrition is also linked to other factors. Maternal education has been linked with nutrition outcomes among children in studies in various settings (Kabubo, Ndenge and Mwabu , 2008;Obuya *et al.,* 2011; Frost ,Forste and Haas, 2005). Findings indicate high illiteracy levels among the caregivers (92.1%) which has negative implications on child health. Maternal education is a strong predictor of childrens health ; educated mothers have children who suffer less from stunting wasting and underweight (Abuya *et al.,* 2012).

Poor maternal dietary quality also impacts on the child's nutrition status. Only 38.5% of the women had an optimal diet based on five or more food group's consumption. This could be as a result of high illiteracy levels among other barriers to food access reveled through FGDs. Literature indicates that animal source foods are rich in several key nutrients but are often lacking in the diets of vulnerable populations (Jin and Lannoti, 2014).

Poor child dietary quality and poor intake of fortified foods was also evident from the survey. Among all age groups (only 6-23 months) only 24.0% received a minimum dietary diversity, 14.9% of them attained a minim diversity meal frequency and 6.2% of them realized the minimum acceptable diet. Dietary diversity is reflected in the number of foods consumed across

several food groups within a period of time, developed to ensure adequate nutrient intake and improve variety of food, thus reducing stunting in children (Darapheak et al 2013). Dietary diversity is also an indicator for household food security (Kennedy, Fanou and Brouwer,2009) .

Use of IFAS results reveal high awareness of IFAS availability with most of the respondents reporting to have been issued with IFAS tablets. However, IFAS intake in both previous and current pregnancies was registered to be poor with low consumption compared to the given amounts. There is a causal link between maternal Iron Deficiency Anemia and adverse birth outcomes including low birth weight and increased perinatal mortality; there exists a substantial proportion of neural tube defects related to inadequate consumption of folic around the time of conception (Black *et al.,* 2013). From the FGD discussions, side effects such as nausea, vomiting and sometimes unavailable in health facilities are a common challenge to IFAS intake . Community belief that IFAS is a form of family planning and might lead to are barriers to IFAS intake.

MNPs are powdered preparations of vitamins and minerals which are mixed into food before consumption, developed to address the challenge of childhood anemia through delivering Iron and a blend of other important vitamins and minerals (Zlotkin *et al.,* 2005) . Low levels were reported in micronutrient supplementation from the survey. Only (21%) of the respondents had ever seen or heard about MNPs even after being shown a sample. Only 7.1% reported receiving MNPs in the last 6 months. This could be linked to the poor health seeking behavior and poor dissemination on child feeding information at the health facilities. The use of micronutrient sprinkles with IYCF education reduces anemia and Iron Deficiency compared with IYCF education only (Jack *et al.,* 2012). With low intake of fortified foods, MNPS, poor dietary diversity, low minimum meal frequency, low minimum acceptable diet and poor intake of fortified foods in Mandera children at at risk of micronutrient deficiencies. Children should be given sprinkles and sustained until 2 years in order to cover up for the most vulnerable period.

CONCLUSIONS

Based on the above findings we can draw the following conclusions; Household characteristics indicate high illiteracy levels among the caregivers, 82.3% had no education and a majority are

housewives (53.6%). There is a high mean household size (5.3 members), in comparison to the national average according to KDHS, 2014.

Home deliveries were high among the respondents; 57.2% delivered at home by TBA while Hospital deliveries (35.6%) are very low in Mandera county in comparison to national levels according to KDHS 2014. . This indicates that interventions should be put in place to encourage facility delivery. Qualitative discussions revealed that lack of ambulance for referrals, long distance to the health facilities, presence of experienced TBAs in the community, presence of male nurses and fear of caesarian section deliveries are major barriers to health facility deliveries.

Slightly more than a half of the children had health card's which indicates that some some women deliver with help of TBA and later seek health care services. Breastfeeding practices in comparison to KDHS 2014 results reveal; high levels of timely breastfeeding initiation (86.1%), high exclusive breastfeeding (68.3%), low continued breastfeeding at one year (68.7%) and low continued breastfeeding at 2 years (19.5%). Most of the children were breast fed less than one hour after birth (86.1%) this is high compared to the National average as compared to KDHS 2014 results (62.2%) and a 5.3% improvement in comparison with average North Eastern region results according to KDHS 2014. Prelacteal feeding is high with 22.1% being given pre lacteals this is a 6% increase from the National levels compared to KDHS 2014 results. Qualitative discussions on breastfeeding attitudes, perceptions and practices revealed that cultural practices, inadequate breast milk, household chores, the belief that water cools the baby are some of the barriers to exclusive breastfeeding.

Dissemination of child feeding information by health care workers is low. Close to half of the respondents did not receive child feeding information (42.8%). Those who received child feeding information being mostly from their mother or mother in law (51.5%) and CHV (46.6%). This implies that most mothers receive information from unskilled sources rather than Health care workers who are more skilled.

Appropriate introduction of complementary was high, however overall complementary feeding indices show poor child feeding, with low consumption of fortified foods. Appropriate introduction of complementary foods (6-8 months) was practiced by most of the respondents (53.2%). However, is low in comparison to the national level (80%) according to KDHS 2014. Use of bottles with nipples as a practice and attitude is still high. Most commonly used container

is bottle with nipple or holes (38.8%), it is also the highest in terms of what the respondents believe should be used (46.6%), yet it is not the recommended container (cup with no cover or bowl and spoon is ideal).

Low dietary diversity,low minimum meal frequency and low minimum acceptable diet is evident. Among all age groups (only 6-23 months) only 24.0% received a minimum dietary diversity, 14.9% of them attained a minimum meal frequency and 6.2% of them realized the minimum acceptable diet. Further their diets mainly consisted of grains & tubers (76.5%), dairy products (86.9%) and their consumption of the fortified foods was equally poor (19.1%). High recommended responsive feeding practices; a high proportion of respondents did something to encourage a child to eat (64.5%), (79.0%) of whom encouraged child verbally, by praising the child (78.6%). Feeding a child after illness is still high; after illness on average majority gave more food (53.8%) thus increasing nutrient intake to make up for nutrient losses and allow for catch-up growth . However ,close to half gave same and less amounts of food after illness hence a risk of delayed recovery. This could be attributed to the low dissemination of nutrition knowledge.

Low levels were reported in micronutrient supplementation from the survey, where less than a quater (21%) of the respondents had ever seen or heard about MNPs even after being shown a sample. Additionally, Only 7.1% reported receiving MNPs in the last 6 months. Of the respondents who never received MNPs, majority lack knowledge on MNPs (71.1%).

Women mostly initiate ANC after the first trimester however majority achieve the recommended number of ANC visits. In comparison to the current pregnancy, more women ever attended ANC (73.8%) during pregnancy with the index child. Overall majority, attended ANC between the 3rd and 5th month of pregnancy with index child (73%), whereas majority received between 2 to 4 ANC visits (75.4%), 43% achieved the recommended number of ANC visits. During ANC visits essential information given was to more than 60% of the respondents except Birth planning (46.6%), Growth monitoring (43.7%), HIV/AIDS (55.5%), Infant feeding (53.4%) which were the least provided information. All essential services given reached over 50% of the respondents, with the least provided services being deworming (45.6%), anti-malarial (41.5%) and mosquito nets (16.3%).Generally, information and services given in current pregnancy were lower compared to previous pregnancies with the index child. Qualitative discussions from FGDs revealed that monitoring of the fetus during ANC visits, presence of drugs and female nurses in

health facilities are incentives to ANC attendance. However, household chores and believe that they should health services only when sick are some barriers to ANC attendance.

Post-natal care for women is one of the key pillars in securing maternal health; however, PNC for both mother and child is also very low. Only 11.3% of the respondents took child to clinic for the first time during the critical two day period. Majority attended PNC for the first time after one month (45.5%). According to regional results for KDHS 2014, North eastern region is marked by high rates of no postnatal checkup (80%), there is a great improvement in PNC attendance whereby only 19.3% did not attend clinic. Qualitative discussions reveal that women are aware of the importance of PNC, mostly attend PNC for vaccination of their infants; however some believe injections trigger high fever in infants. Some women see no need to attend PNC when they have no complications. Iron folic acid supplementation is critical in maternal nutrition enhancement. Use of IFAS results reveal high awareness of IFAS availability with most of the respondents reporting to have been issued with IFAS tablets , mostly folic was issued. Even though 52.3% of respondents received IFAS during pregnancy, 40.1% reported to have had supplements at home but were not consuming. From the FGD discussions, side effects such as nausea, vomiting and sometimes unavailable in health facilities are a common challenge to IFAS intake . Community belief that IFAS is a form of family planning and might lead to are barriers to IFAS intake. It is worth noting that 4.7% consumed soil/mineral salts despite deworming being among the least provided ANC services. Based on MUAC as a child nutritional status indicator; half of the children were nourished overall (49.9%). Even though only 9.2% of the pregnant and lactating women were malnourished, the overall diet quality was poor with low uptake of animal sourced foods and Vitamin A rich fruits and vegetables. Only 38.5 % of the women had an optimal diet based on five or more food group's consumption.

It was noted from FGDs that poverty, long distance to the market, pastoral lifestyle, large family size, misleading cultural believes and drought are the major barriers to food access. Targeted health and nutrition education among; men and leaders, women and the community in general is a necessity, with messaging based on the reinforcing beliefs and barriers as indicated for each target group during FGDs.

RECOMMENDATIONS

Based on the findings, the recommendations are grouped into three major domains; Behavior change related activities, health systems interventions, and lastly community based integrated programs.

DOMAIN	ASPECTS	DURATION TO IMPLEMENT
Behavior change communication	Promote early ANC attendance targeting first trimester and increased visits	Short term
	Sensitize and educate women on need for facility delivery and to attend PNC within 48hrs of delivery	Short term
	Sustain knowledge and attitudes toward optimal breastfeeding practices and appropriate complementary feeding practices	Short term
	Promote behavior change towards acceptance and use of IFAS and MNPs and sensitize men on value of IFAS and MNPs.	Short term
	Promote responsive feeding and feeding a sick child practices among primary caregivers	Short term
	Identify and use appropriate communication channels and messaging (illiteracy) to target Men and leaders, women and the community in general on MICYN education	Short term
	Develop and implement cooking sessions among women to include balanced diet concept based on locally available and accepted foods for women and children to improve dietary diversity	Medium term
Health systems interventions	Sensitize and monitor staff on the implementation and adherance to patients rights (Kenya National Patient Rights Charter October 2013) and patient attitude	Short term
	Capacity building in terms of more women health care workers working in Maternity to enhance facility delivery uptake.	Short term
	Enhance full ANC services to include; mosquito net provision, de-worming and anti-malarials, ANC information package including infant feeding information	Short term
	Revamp ANC, Facility delivery and PNC visit incentive programs to increase health service utilization	Medium term
	Enhance stocking levels for MNPs and IFAS	Short and medium term
	Pilot waiting mothers intervention in areas where facility reach for delivery is a challenge, and contextualize to cultural taste	Medium term
	Shorten distance to health facilities by constructing and equipping facilities	Long term
Community based integrated programs	TBA re-orientation programs for referral purposes other than home delivery	Medium term
	Recruit train and deploy more CHVs for revitalize MTMSGs	Medium term

	Integrated nutrition and livelihood programs (such as Agric and nutrition interventions) for food security to improve access to food	Medium and long term

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APPENDICES


KAP QUESTIONNAIRE 15T


Mandera KABP Training Programs.do


KABP FGD MOVEMENT PLAN - F


Mandera KABP Survey clusters.xlsx


ADDITIONAL QUESTIONs for UNIC


KABP SURVEY MOVEMENT PLAN - FI


Supervisor Movemen plan.xlsx


FGD CHVs Mandera.docx


FGD LEADERS Mandera.docx


FGD MEN Mandera.docx


FGD OLDER WOMEN Mandera.docx


FGD YOUNGER WOMEN Mandera.doc


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