

**KNOWLEDGE AND ATTITUDES ON COMPLEMENTARY FEEDING PRACTICES  
AMONG THE HEALTHCARE WORKERS IN LEVEL 2 AND 3 HEALTH FACILITIES  
IN NAIROBI COUNTY**

**BY  
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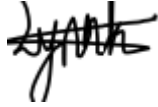
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## DECLARATION

This dissertation is my original work and has not been presented in any other university for the award of a degree.

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## **ABBREVIATIONS**

<b>CME</b>	Continuing Medical Education
<b>EBM</b>	Expressed Breast Milk
<b>HCWs</b>	Healthcare Workers
<b>IYCF</b>	Infant and Young Child Feeding
<b>KDHS</b>	Kenya Demographic Health Survey
<b>KEPH</b>	Kenya Essential Package for Health
<b>KNH</b>	Kenyatta National Hospital
<b>KNH-UoN ERC</b>	Kenyatta National Hospital University of Nairobi Ethics Research Committee
<b>MUAC</b>	Mid Upper Arm Circumference
<b>UNICEF</b>	United Nations International Children’s Emergency Fund
<b>UoN</b>	University of Nairobi
<b>WHO</b>	World Health Organization

## OPERATIONAL DEFINITIONS OF TERMS

**Complementary feeding:** This term refers to the supplementation of breast milk with other foods and liquids to provide full nutritional needs to babies aged between 6 to 24 months.

**Minimum meal frequency:** Is the frequency with which breastfeeding and non-breastfeeding infants are given solid and semi-solid food. The recommended minimum frequency is defined as  $\frac{1}{2}$  a cup of mashed foods 2 to 3 times daily and 1 or 2 snacks between meals for breastfeeding babies up to 9 months and:

- a.  $\frac{1}{2}$  a cup of mashed foods 3 to 4 times daily and 1 to 2 snacks between meals from 9 -12 months
- b.  $\frac{3}{4}$  a cup of family foods 3 to 4 times daily and 1 to 2 snacks between meals from 12-24 months.
- c. 4 or more meals at minimum per day, with 1 to 2 snacks between meals for non-breastfeeding babies aged 6 to 24 months.

**Minimum Dietary Diversity:** It is the proportion of children aged 6-24 months who consume four or more food groups from the seven recommended food groups for high dietary quality and to meet the daily energy and nutrient requirement.

**Minimum acceptable diet:** It is a composite indicator combining minimum dietary diversity and minimum meal frequency indicators. It is the proportion of children between 6 to 24 months who attain both minimum meal frequency and minimum Dietary Diversity

**Stunting:** Height for age below 2 standard deviations of the WHO child growth standards median for age.

**Wasting:** Weight for height below standard deviations of the WHO child growth standards median or in children aged 6 to 59 months a MUAC of  $\leq 12.4$  cm.

**Underweight:** Weight for age below 2 standard deviations of the WHO child growth standards median.

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**ABSTRACT**

**Background:**

World Health Organization (WHO) recommendations on infant nutrition state that mothers should exclusively breastfeed their children for the first six months of life. At six months, an infant's energy requirements exceed that provided in breast milk. Complementary foods are therefore required besides breast milk to meet these nutritional needs. Whereas there are many studies on knowledge and attitudes of mothers on complementary feeding, there are fewer studies on health workers and their knowledge and attitude on complementary feeding. Health care workers (HCWs) are vanguards of knowledge on complementary feeding, and mothers trust them. HCWs working in primary healthcare facilities are often the first point of contact for mothers. As such, there is a need for these HCWs to have current updated knowledge on appropriate complementary feeding. It is therefore essential to have background knowledge of HCWs and their attitudes towards complementary feeding.

**Primary objective:**

To assess the knowledge and attitudes towards complementary feeding practices among HCWs in level 2 and 3 health facilities in Nairobi county.

**Secondary objectives:**

To describe factors associated with good knowledge and attitudes on complementary feeding practices among HCWs in level 2 and 3 health facilities in Nairobi County.

**Methodology:**

A multistage sampling method was done. Random sampling was done to select 6 sub counties. Then stratified method was done to select the health facilities (33 dispensaries and 16 health centres) and also for the different cadres in the health facilities. Random sampling method was then applied in each stratum until the desired sample was achieved. Data collection was done using a researcher administered structured questionnaire to obtain data on HCWs knowledge and attitude of complementary feeding and attitude. The target population of the study included nurses, clinical officers, and nutritionists in the above facilities. HCWs in the selected health facilities were eligible for the study. The exclusion criteria included HCWs who did not give consent and those who were on leave during the study period. A scoring system was used to analyse the knowledge and 5-point Likert scale was used to assess the attitudes of HCWs on complementary feeding. Logistic regression model was done to look for factors associated with knowledge and attitude of HCWs on complementary feeding.

**Results:**

The study included a total of 33 dispensaries and 16 health facilities. A total of 224 HCWs who included nurses, clinicians and nutritionists were enrolled. When it came to knowledge, 8% had poor knowledge (scored below 50%) 21% had good knowledge (scored between 50-64%), 37% had very good knowledge scored between (65%-74%) and 34% had excellent knowledge (scored above 75%). Nutritionists had the highest level of knowledge with a mean score of 75% while enrolled nurses had the lowest mean score at 61%. There was good knowledge on timely introduction of complementary feeds after 6 months at 92%, while only 61% of the HCWs knew that children should be fed a minimum of 4 food groups daily. There was good knowledge on correct frequency and amount of complementary feeds with 84% of the HCWs having the correct response, while only 52% of the HCWs had correct knowledge on nutrient content of complementary feeds and only 51% had correct knowledge on food hygiene and handling. The multivariable analysis showed that factors associated with good knowledge included cadre, years worked after basic training and sub counties. The multivariable analysis associated with positive attitude included cadre and age. When it came to attitude, majority had positive attitudes with

29% having positive attitude and 49.1% having very positive attitude while 21.9 % had poor attitude. The multivariable analysis associated with positive attitude included cadre and age.

### **Conclusion**

There was good knowledge on complementary feeding by the HCWs as the mean knowledge score was 66%. In reference to the attitude of the HCWs, **49% had very positive attitude, 29% had positive attitude** and 21.9 had poor attitude. Factors associated with good knowledge included cadre of the HCWs with nutritionists having good knowledge, years worked after basic training with those who had worked for less than 10 years having good knowledge and the sub counties within which the health facilities were located being a factor with Westlands and Starehe Sub counties associated with good knowledge. Factors associated with positive attitude included cadre with nutritionists having positive attitude and age with HCWs above 45 years having positive attitude.

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background**

The current Infant and Young Child Feeding (IYCF) guidelines are that infants' nutrition within the first six months should be breastmilk alone, after which complementary feeding should begin. According to WHO, complementary feeding should begin when the nutrients in breast milk are inadequate to fulfil the nutritional needs of infants; hence additional foods and liquids along with breastmilk are required(1). After 6 months, breastmilk is insufficient to cater to the dietary needs of an infant. This is because a baby is more active and has doubled his or her birth weight. At the same time, an infant is now developmentally ready to start complementary feeding at this age as the digestive system is mature enough to digest the starch, protein and fat in a non-milk diet. Hence optimal IYCF has both long term and short term benefits as it protects children from both morbidity and mortality(1).

Compared to the period of exclusive breastfeeding, it is during the period of complementary feeding that children have an increased risk of malnutrition. With complementary foods, an infant tends to breastfeed less, as the complementary foods displace breastmilk. If the complementary foods are nutritionally inadequate and unsafe, the child becomes malnourished(2). Globally it is estimated that suboptimal breastfeeding increases the mortality risk within the first two years of life. The number of reported child deaths is estimated at 814,000 deaths per year or 11.6% of all under-five deaths annually. Ideal complementary feeding could prevent 6% of such under-five child deaths globally(3). In Kenya, malnutrition is rife in children below 2 years of age. As per the Kenya Demographic and Health Survey (KDHS) of 2014(4), stunting is the commonest type of malnutrition with 36% of all children 18 to 23 months stunted. Wasting is highest among children aged 6 to 8 months and 9 to 11 months at 7% for each age group with inadequate nutrition requirements of complementary feeding.

Best practices during prenatally and early infancy have the most significant impact on the prevention of child malnutrition(5), as the promotion of good feeding practices is critical in reducing child malnutrition and mortality Part of the IYCF guidelines is to train Health Care

Workers (HCWs) on complementary feeding as mothers rely on them for information on breastfeeding and complementary feeding.

**What is appropriate complementary feeding(6) ?**

**Adequate** –Foods should give adequate energy, micronutrients, and protein to provide the nutritional needs of a child’s growth.

**Timely** –Introduce food when the required energy and nutrients surpass what exclusive and frequent breastfeeding can provide.

**Safe** –Storage and food preparation should be hygienic, feeding done by clean hands with clean utensils and avoid using bottles and teats.

**Properly fed** – Considering appetite and satiety signs of a child while feeding as you actively encourage the child to eat food using fingers, spoon or self-feeding – as suitable for age.

**Table 1: Practical guidance on the quality, consistency frequency and amount of food to offer children 6-24months of age who breastfeed on demand as per WHO**

Age	Energy required per day on top of breast milk	Consistency	Frequency	Amount of food per meal
6–8 months	200 kcal per day	Begin with thick porridge, well mashed foods Continue with mashed foods	2–3 meals per day Conferring to child's appetite, 1–2 snacks can be given	Start with 2–3 tablespoonful’s per feed, increasing slowly to ½ of a 250 ml cup
9–11 months	300 kcal per day	Finely chopped or mashed foods, and foods that baby can pick up	3–4 meals per day Conferring to child's appetite, 1–2 snacks can be given	½ of a 250 ml cup/bowl
12–23 months	550 kcal per day	Family foods, chopped or mashed if necessary	3–4 meals per day Conferring to child’s appetite, 1–2 snacks can be given.	¾ to full 250 ml cup/bowl

**Further information**

The amounts of food incorporated in the table are used when the energy concentration of the meals is about 0.8 to 1.0 kcal/g.

If the energy concentration of the meals is about 0.6 kcal/g, the mother ought to upsurge the energy concentration of the meal (adding special foods) or increase the quantity of food per meal. For example:

for 6 to 8 months, increase slowly to two thirds cup

for 9 to 11 months, offer three quarters cup

for 12 to 23 months, offer a full cup

The table should be modified based on the energy density of native complementary foods.

The mother or caregiver must feed the child following the principles of responsive feeding, recognizing the hunger and satiety cues. These signs should direct the quantity of food provided at each meal and the need for snacks.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

Sufficient nutrition in infancy and childhood is key to achieving full development potential in children. The period between births to 2 years is vital in promoting optimum growth, health, and behavioural development. In 2001, the WHO convened a global consultation on complementary feeding. A group of scientists and programme managers were invited to review and update recommendations for complementary feeding and herein developed guidelines through several technical consultations to standardise the feeding of children between 6 to 24 months. They looked at several studies to aid in the development of the complementary feeding guidelines(7)

### **2.2 Guiding principles of complementary feeding**

Complementary foods need to be timely, adequate, and safe. Such practices ensure the fulfilment of children's nutritional needs. Several studies have shown the efficacy of exclusive breastfeeding for 6 months. Cohen *et al* showed that complementary feeds introduced earlier than 6 months tend to displace breast milk(8). There was also an increased risk of diarrheal disease through contamination of the complementary feeds. At 6 months, breast milk alone is inadequate to fulfil an infant's nutritional requirements. Moreover, at 6 months, infants are starting active exploration of the environment; hence, there is increased exposure to microbial contamination for example through soil even if complementary feeds are not yet initiated. It is for this reason that the technical experts decided that the onset of complementary feeding should be at 6 months.

Complementary feeds need to be adequate to ensure that they avail energy, protein, vitamins, and other nutrients micronutrients to fulfil infants' nutritional requirements. The energy requirements from complementary feeds in breastfed infants are approximately 200 kcal per day at 6-8 months, 300 kcal per day at 9-11 months, and 550 kcal per day at 12-23 months as per Dewey and Brown 2002(8). Children below 2 years who reside in developing countries should consume about 137–187 g/day, 206–281 g/day and 378–515 g/day of complementary foods at the age of 6–8 months, 9–11 months and 12–24 months respectively to fulfil their energy requirements. Thus the minimum meal frequency for an infant 6-8 months breastfeeding should be 2 meals with one snack, 9-11 months is three meals with one snack and 12 -23 months is four meals with 1-2



snacks. In a non-breastfed child, the child should have 4 or more meals, and the snacks should be two or more with an increase in dairy products to adequately provide calories and calcium(8).

The child should feed on an array of foods to achieve dietary diversity. Complementary feeding comprises of 7 food groups, and they are; Grain roots and tubers, legumes, nuts and dairy products, flesh foods, eggs and vitamin A-rich fruits and vegetables. Flesh foods and eggs should be included often in their diets. These meet the needs of micronutrients (like zinc and iron) that vegetarian diets cannot adequately supply. In the first 2 years of an infant's life, there is accelerated growth and development; hence, very high nutrient requirements per unit body weight of infants and children. Low nutrient beverages, e.g. coffee and tea, are not encouraged as they can interfere with absorption of iron as per Allen Ahluwalia(9) and mother should breastfeed their children for two years or more. Children 12-23 months receive up to 35% of nutrients from breast milk, as it is high in fats and micronutrients. A study was done in the Gambia by Prentice and Paul *et al* showed that breast milk provides 70% of vitamin A, 40% of calcium and 37 % of riboflavin at 15-18 months of age. It is also essential during periods of sickness when there is a reduced appetite for food, but breastfeeding continues(10).

Complementary feeds should be safely prepared and stored. Caregivers need to wash hands, serve the food immediately after preparation, store food well, use clean utensils while serving food and avoid using feeding bottles, which are laborious in cleaning. Martinez et al. noted that diarrhoeal diseases occur mostly in the second half-year of infancy. Feeding bottles are laborious to wash and prone to pathogens(11). Another study conducted in Peru by Black et al. noted that E Coli was positive in 35% of bottle nipples, while 31% of teas served in tea bottles had E. Coli contamination. However, only 2% of teas served in cups had E. coli(12).

Children should be appropriately fed complementary feeds. Responsive feeding practice where young infants are fed slowly and patiently and not forced with the children being talked to and having eye contact as they feed is encouraged. Data show that feeding behaviour has an impact on dietary intake and child health. Ruel *et al.* conducted a study in Rural Ghana that showed that positive feeding behaviours were associated with improved child anthropometric measurements(13).

There should be a gradual increase in food consistency and variation in foods be with the age of a child. Pureed foods are suitable for 6 month-old children, while at 8 months, they can consume finger foods, and at 12 months they can partake in family foods as based on the neuromuscular development of infants(13). There is suggestive evidence by Northstone *et al.* of a critical time of introduction of lumpy solid foods. Delaying the introduction of lumpy foods beyond 10 months might present with feeding difficulties later(14). Evidence from Dewey *et al.* suggests that at 12 months, children can begin to feed on family foods(11).

Thus the 10 guiding principles of complementary feeding as identified in the “*Guiding principles for complementary feeding of the breastfed child*” by the WHO are(7)

- i. Sole breastfeeding for six months and initiation of complementary feeds at 6 months while still breastfeeding.
- ii. Continue frequent breastfeeding up to two years or more.
- iii. Practising responsive feeding as designated by psychosocial care.
- iv. Adhering to proper food hygiene and handling techniques.
- v. At 6 months, infants ought to feed small quantities of food and gradually increase the amount with increasing age of the child.
- vi. Gradual increase of food variety and consistency with age and growth characteristics of the child.
- vii. Increase the frequency of feeding complementary feeds.
- viii. Feed an array of nutrient-rich foods to provide all nutrients.
- ix. Using fortified complementary foods.
- x. Increasing liquid intake during illness.

**Table 2. 1 Studies that led to the 10 guiding principles on complementary feeding**

Author, title and year	Study design and population	Results
<p>Cohen <i>et al</i></p> <p>Effect of age of introduction of complementary foods on infant breast milk intake, total energy intake and growth: A randomised intervention study in Honduras 1994</p>	<p>A randomised control study with 3 intervention groups of infants at 4 months</p> <p>First group complementary food introduction at 4 months (n=47)</p> <p>2<sup>nd</sup> group exclusive breastfeeding for 6 months (n=50)</p> <p>3<sup>rd</sup> group complementary food initiation at 4 months and continuation of baseline breastfeeding(n=44)</p>	<p>Breastfed infants self-regulate their total energy intake when other foods are introduced. Therefore there is no advantage in introducing complementary feeds before 6 months.</p>
<p>Black <i>et al</i></p> <p>Incidence and aetiology of infantile diarrhoea and major routes of transmission in Huascar, Peru 1982-1984</p>	<p>A community-based study</p> <p>153 infants</p>	<p>Study infants had 10 episodes of diarrhoea in the first year of life due to use of dirty utensils.</p> <p>Hence adhere to proper hygiene and food handling practices.</p>
<p>Ruel <i>et al</i></p> <p>Good care practices can mitigate the negative effects of poverty and low maternal schooling on children's nutritional status: Evidence from Accra, Ghana 1997</p>	<p>Cross-sectional study</p> <p>475 households with infants over 4 months</p>	<p>Mothers who practised good care practices had children with good nutritional status. Examples of good care practices included giving children fortified cereal, taking them for immunization and regular growth monitoring</p>
<p>Northstone <i>et al</i></p> <p>The effect of age of introduction to lumpy solids on foods eaten and reported feeding difficulties at 6 months and 15 months in Avon, England 1991-1992</p>	<p>Longitudinal study</p> <p>3 groups of infants initiated to lumpy foods at different months of life</p> <p>1<sup>st</sup> group before the age of 6 months</p> <p>Group 2 between 6-9 months</p> <p>Group 3 after 10 months</p>	<p>Children are prone to experience challenges in feeding with the introduction of lumpy foods at 10 months or after.</p> <p>The challenges included difficulty in feeding and more distinct likes and dislikes to foods.</p>

### **2.3 Knowledge and attitude of healthcare workers on complementary feeding**

Whereas there are many studies on knowledge of complementary feeding on mothers, there are few on HCWs and their knowledge of complementary feeding. The Nutritional messages that HCWs share with the caregivers during child care counselling is effective in improving the feeding practices of the caregivers and improving the nutrition of the children(15). It is therefore crucial that HCWs acquire knowledge on complementary feeding and acquire the skills to support and provide caregivers with knowledge on good feeding practices, assisting them when they are anxious and offering accurate information(16). Caregivers should receive accurate information and emotional support so that they can feel confident in raising children. The HCWs need to comprehend the type of support information and interaction the mother needs from them(15)

One of the principles of complementary feeding is that with the initiation of complementary foods, there should be continuity of frequent breastfeeding, and it should be continued for two years and beyond. Nurses are of utmost importance in the success rates of breastfeeding both in the commencement and duration of breastfeeding because they are the most significant professional fronts in health care provision(17). The knowledge of nurses in regards to complementary feeding and their attitudes towards it is predictive of actual supportive behaviour(18).

Tracy Brewer *et al.* in 2012 did a study on the knowledge and attitude of paediatric nurses regarding breastfeeding in a paediatric quaternary medical centre in the Midwestern region of the United States. A questionnaire administered to the nurses showed that the mean knowledge score was 72%, whereas the mean attitude score was 81%. From the study, both attitude and knowledge score increased in nurses who had a personal breastfeeding experience(18). This finding is consistent with other studies that HCWs who have had a personal breastfeeding experience have positive breastfeeding attitudes(19). William *et al.* did a study looking at nurses' knowledge of current infant guidelines in Derbyshire Hospital in the U.K. She assessed 127 nurses who worked in the hospital and found that only 33% had good knowledge of the current guidelines. Most of them were not aware that breastfeeding should extend for two years or more.

WHO had recently developed a model chapter on IYCF, which was a useful resource for all HCWs(7)

Mustafa *et al.* did a cross-sectional study on the efficacy of an educational intervention on knowledge and attitude on breastfeeding among 137 interns at Cairo University Hospital. He then trained 50 of them using the UNICEF/WHO 20-hour training on breastfeeding. The knowledge level of breastfeeding before training stood at 53% whereas, after training, knowledge levels increased to 80%. The attitude levels remained almost consistent at 80% before the training and 84% after the training. The predominantly Islamic culture which is supportive of breastfeeding might explain the positive attitude towards breastfeeding in Egypt(16).

A study conducted by Uto *et al.* in a hospital in a semi-urban area in South Nigeria on breastfeeding knowledge and attitude on 36 HCWs noted knowledge gaps present in the HCWs. The study included doctors, nurses and extension health workers. From the study 97% identified breast milk as the optimum feed for an infant, 84% knew the correct duration of exclusive breastfeeding, but only 36% knew that a child could be breastfed for up to 24 months and beyond(20). This study has similarities to a study by Brahmanekar *et al.* (17) on knowledge and attitude of nursing staff on complementary feeding in a tertiary care hospital in India. It was a cross-sectional study assessing 100 nurses in the study. Whereas 89% were able to answer correctly about complementary feeding only 26% were educated on the significance of breastfeeding at the 2<sup>nd</sup> year of life, and only 17% knew that the duration of breastfeeding should be 2 years and beyond. The source of information for the nurses was from CMEs at 52% while 48% stated it was part of their education. Most had a positive attitude towards complementary feeding with 97% aware that good complementary feeds can prevent malnutrition and 85% aware that during illness breastfeeding aids in the faster recovery of the infant as per the complementary feeding guidelines that there should be increased liquid intake during illness.

In Brazil, Ramos *et al.* evaluated the knowledge of breastfeeding and supplementary feeding of HCWs working in Primary healthcare(15). The Professionals recruited were 168, including doctors' nurses and community health agents. The mean score for both the doctors and the nurses on complementary feeding was average at 62.5%, whereas the other cadres had a lower score.

The low scores might be due to very few CMEs and training on complementary feeding with only 42% having attended any CME in the previous year on complementary feeding. The analysis is of concern because HCWs must be prepared and trained in complementary feeding.

A study done by Shakila *et al* looked at the effect of training first-level health workers on infant feeding. It was a single-blind randomised control trial done in Pakistan with the selection of 36 health facilities each paired to HCW. Eighteen health facilities served as the control group, and the other eighteen received training on infant child feeding, making them the intervention group. The results were that in the intervention group, mothers were able to recall recommended feeds, there was less growth faltering, and the children had more weight at the end of 6 months as compared to the control group(21).

Nikiema *et al* did a cross-sectional cluster-randomised study of 12 clusters in Burkina Faso whereby in the intervention group HCWs were trained on infant nutrition whereas, in the control group, there was no training. They followed up the groups and found that in the intervention group, the children had better growth and reduced morbidity hence reduced malnutrition levels(22)

The study above is also similar to a study done by Sunguya *et al* who did a systematic review on 10 studies to study the effect of on nutrition training of HCWs and child feeding practice including feeding frequency, energy intake and dietary diversity among children aged 6 to 24 months. The conclusion was that nutritional training of HCWs improved energy intake, feeding practices and dietary diversity of children aged 6 -24 months through three pathways. The first being that the training refreshed and increased their knowledge in nutrition hence enabling them to address particular elements of under nutrition in their region. Secondly, there was nutrition knowledge transfer when they counselled caregivers who visited their facilities and finally they were the agents of change by improving their child feeding practices(23)

HCWs working in primary healthcare are essential, as they are often the first point of contact of mothers. Samuel *et al* provided a training intervention on IYCF to health workers working in primary health facilities in Ibadan, Nigeria (24). He selected 10 facilities in Ibadan Municipality

that had the highest attendees, and that saw antenatal and postnatal mothers. He assessed various aspects of complementary feeding such as knowledge on dietary diversity and adequacy of foods, meal frequency and timeliness of the introduction of complementary feeds using a questionnaire. He noticed that there was poor knowledge with only 1.6% of participants able to name four or more food groups, only 32% able to state the minimum meal frequency at the different age groups and only 3.2% able to know how to improve the adequacy of complementary feeding. There was, however, good knowledge on the correct time to introduce complementary feeding with 79% knowing that before the training. After the training, the knowledge improved with 83% able to mention at least four food groups, 79% able to state the minimum meal frequency at different age groups and 18% able to state 3 ways of improving the adequacy of complementary feeding. However, some poor attitudes remained particularly on introduction of complementary feeding in HIV positive mother, where they still felt that they could introduce complementary feeds before 6 months and that breastfeeding for a long duration leads to sagging breasts. The findings suggest deeply rooted influences that continue to exist among HCWs and form their views even after medical training and retraining(20),(24) Even with adequate training, the HCWs might still pass along negative attitudes to mothers while counselling them on complementary feedings, thus affecting infant and child feeding practices(23)

In rural Ghana, Christiana Nsiah did a study looking at gaps in the knowledge of recommended child feeding practices among HCWs working in child welfare clinics in primary health facilities in two districts in rural Ghana. The two districts were purposively selected as they ranked first and second in having the highest prevalence of underweight children under five in that region. Overall knowledge of complementary feeding was average with half the participants' scoring 52%. There was poor knowledge of foods that are iron promoters and those that are reducers. When it came to the timeliness of complementary feeds, only 54% of HCWs knew that children who have started on complementary feeding should breastfeed up to 2 years or beyond. In children 6 -23 months who were not breastfeeding only 6.8% knew the correct minimum meal frequency of 4 meals or more and only 9.9% knew that these children needed 2 or more added frequencies of dairy or dairy products for their calcium intake. HCWs need some courses on complementary feeding(17) as HCWs are the vanguards of information dissemination(16),(20).

**Table 2. 2 Knowledge and attitude of HCWs on breastfeeding and complementary feeding**

Author, title and year	Study design and population	Results
Utoo <i>et al</i> Breastfeeding knowledge among HWs in a health care facility in South Nigeria: 2012	Cross-sectional study 36HCWs	36% knew that breastfeeding should last up to 2 years and beyond.
Christiana Nsiah <i>et al</i> Gaps in knowledge of recommended child feeding practices among HCWs in primary health facilities in Afram Plains North and South Districts, Ghana: 2017	Cross-sectional study 192 HCWs	52% had average knowledge of complementary feeding 54% knew the correct duration of breastfeeding in a complementary fed child
A William <i>et al</i> Nurses knowledge of current guidelines for infant feeding and weaning. Derbyshire Children's Hospital, U.K.: 2003	Cross-sectional study 127 nurses	33% had good knowledge on infant feeding guidelines.
Zaman S. <i>et al</i> . Training in complementary feeding, counselling of health care workers and its influence on maternal behaviours and child growth in Lahore, Pakistan: 2008	Cluster randomised control study 36 paired health centres 375 mothers	In intervention groups there was increased knowledge of HCWs from 52% to 65% on complementary feeding Increased dietary diversity from 35% to 61% Increase in flesh foods from 37% to 63%.
Samuel <i>et al</i> A training intervention on child feeding among primary health care workers in Ibadan Municipality, Nigeria: 2016	Cross-sectional study 124 HCWs	Knowledge increased from after training. Before training, only 1.6% could name different food groups while after training it was. 83 %. Before training 32% could name the minimal meal frequency while after training it was 79%
Ramos A.E <i>et al</i> Knowledge of healthcare professionals about breastfeeding and supplementary feeding in the primary healthcare team in Brazil: 2016	Cross-sectional study 168 HWs	38% had good knowledge of complementary feeding
Brahmankar <i>et al</i> Knowledge and attitude of nursing staff about complementary feeding in a tertiary hospital in India: 2014	Cross-sectional study 100 nurses	72% aware of the right age of initiation of complementary feeding 26% aware of benefits of breastfeeding up to 2 years 17% knew that breastfeeding should continue for 2 years and beyond



## **2.4 Study Justification**

In Kenya, stunting is found in 26% of all children under 5 years and wasting in for 4 % of all children under 5 years(4). In Nairobi, the malnutrition rates are lower than the national rates with stunting at 17% and wasting at 2.5%(4). However, several studies done in Nairobi show a disparity in malnutrition rates across different sub-counties. In the slum areas, the stunting rate is as high as 26%, and underweight is at 11% with Kamukunji having the highest rate of stunting at 47%(25). Thus, it is important to assess the knowledge and attitudes of HCWs on complementary feeding in different sub-counties in Nairobi to determine if an association exists between knowledge and attitude of HCWs and the different malnutrition rate in the different sub-counties.

Several studies have shown that guardians have inadequate knowledge on complementary feeding with a study done by Foluke *et al* in Nigeria, showing that knowledge on complementary feeding among mothers was 14.9%(26). However, in areas where HCWs have adequate knowledge, there are improved feeding practices of infants and thus, reduction of growth faltering of children aged 6-24 months(17).

While there have been numerous studies on the knowledge of complementary feeding among mothers, very few, have been done on knowledge and attitude of HCWs on breastfeeding and complementary feeding.

Data generated from this study will be useful to the Ministry of Health and training institutions in targeting interventions towards areas where there are knowledge gap in HCWs.

## **2.5 Study question**

What is the knowledge and attitude of health workers on complementary feeding practice in level 2 and 3 health facilities in Nairobi County, and what are the associated factors?

## **2.6 Objectives**

### **2.6.1 Primary objective**

1. To assess the level of knowledge and attitudes of HCWs towards complementary feeding in level 2 and 3 health facilities in Nairobi county.

### **2.6.2 Secondary objectives**

2. To describe the factors associated with good knowledge of complementary feeding among HCWs in level 2 and 3 health facilities in Nairobi County.
  
3. To describe the factors associated with good attitude towards complementary feeding among HCWs in level 2 and 3 health facilities in Nairobi County.

## CHAPTER 3: METHODOLOGY

### 3.1 Study design

This was a cross-sectional study assessing the knowledge and attitude of HCWs in level 2 and 3 health facilities on complementary feeding.

### 3.2 Study site

The study was conducted in selected public dispensaries and health centres within Nairobi County, which is the capital city of Kenya. Nairobi has the largest number of clinical staff in the country with higher access by physical distance to public health facilities as compared to other regions(27). In Nairobi, there are 599 primary health care facilities representing 84% of health facilities in Nairobi County. Out of these, 52 % are private facilities, 21% are government-owned, and 28% are faith-based and non-governmental organizations. Nairobi has 17 sub-counties, and in total, there are 86 public dispensaries (level 2) and 41 health centres (level 3)(28),(29).

The 4 tiers of healthcare in Kenya as defined by the Kenya Essential Package for Health (KEPH) include (4):

1. Community level: All non-facility based health and related services are classified as community services
2. Primary care level: The first physical level of the health system, comprising all **dispensaries** and **health centres**. This is the 1st level care level, where most clients' health needs should be addressed
3. County level: The first level hospitals, whose services complement the primary care level to allow for a more comprehensive package of close to client services
4. National level: The tertiary level hospitals, whose services are highly specialized and complete the set of care available to persons in Kenya.

### **Dispensaries**

The ideal number of staff in a dispensary includes 2 general clinical officers and 8 nurses. A clinical officer or a nurse is the in charge. They offer outpatient facilities only and patients needing admission are referred to higher facilities. Some of the services expected in a dispensary include voluntary counselling and testing services (VCT), well baby clinics (which include

counselling on complementary feeding), antenatal and postnatal services and regular consultation services.

### **Health Centres**

The ideal number of staff include 2 medical officers, 6 clinical officers, 12 enrolled community health nurse, 8 registered community health nurses and 4 enrolled nurses. The difference between a dispensary and a health centre is that health centres offer in patient services. A medical officer or a clinical officer is in charge. The services offered include; maternity in patient services with a ward, laboratory services, dental services, TB and HIV clinics, baby well clinics (which includes counselling on complementary feeding), antenatal and postnatal services, VCT and diabetes and hypertension clinics.

**Table 3. 1 Distribution of public health facilities per sub-county in Nairobi County.**

<b>Sub-county</b>	<b>Kenya essential package for health(KEPH)</b>		
	<b>Level 2 dispensary</b>	<b>Level 3 Health centre</b>	<b>Total(N)</b>
1. Dagoretti North	6	1	7
2. Dagoretti South	2	2	4
3. Embakasi Central	0	1	1
4. Embakasi East	4	6	10
5. Embakasi North	1	3	4
6. Embakasi South	1	1	2
7. Embakasi West	2	1	3
8. Kamukunji	2	1	3
9. Kasarani	1	3	4
10. Kibra	15	2	17
11. Langata	15	4	19
12. Makadara	3	4	7
13. Mathare	4	0	4
14. Roysambu	4	3	7
15. Ruaraka	3	4	7
16. Starehe	17	2	19
17. Westlands	6	3	9
<b>Total</b>	<b>86</b>	<b>41</b>	<b>127</b>

### **3.3 Study population**

HCWs working in dispensaries and health centres were included in the study population. They included nurses, clinical officers and nutritionists. In Nairobi County, the technical health workforce comprises of nurses being the majority at 41%, clinical officers at 8.2%, and medical

officers at 5.8% amongst others. Nurses **who compromise 41% of all the HCWs** in Nairobi County constituted a large proportion of the study population(30).

### **3.3.1 Inclusion criteria**

Health Care Workers in the selected dispensaries and health centres who gave consent were eligible for inclusion in the study. They included qualified nurses, clinical officers and nutritionists.

### **3.3.2 Exclusion criteria**

- Health workers who did not give consent
- Health workers who were away on leave during the study period
- Health workers who were on attachment or internship

### **3.3.3 Sampling method**

Nairobi has 17 sub-counties, and in total, there are 86 government-owned dispensaries (Level 2), and 41 government-owned health centres (level 3) spread across the sub-counties. (Level 3)(28).

The Sampling method used was a multistage sampling technique.

A sampling of Sub Counties

Step 1. Selection of sub-counties. According to the WHO, 30% of clusters can be used for sampling. Hence automated random sampling was done to select 6 out of the 17 sub-counties(31).

Step 2: All the health facilities in each of the six sub-counties were listed and categorized as either dispensaries or health centres.

Step3. To get the total number of health facilities the formula in Service Availability and Readiness Assessment (SARA) was used to compute the sample size for primary level facilities to ensure a sufficient number(32).

$$n = [(Z^2 * p * q) + ME^2] / [ME^2 + Z^2 * p * q / N] * d$$

n = desired sample size

z = confidence level at 95% (1.96)

ME = margin of error (15%)

p = the anticipated proportion of facilities with the attribute of interest (0.5)

q = 1-p which is 0.5

N = population size of level 2 and level 3 facilities in Nairobi County is 127

d = design effect is 1.5

$$n = \frac{3.84 * 0.5 * 0.5 + 0.0225}{[0.0225 + 3.84 * 0.5 * 0.5 / 127] * 1.5}$$

n= 49 health facilities

Stratification was done to arrive at the number of dispensaries and health centres to be sampled:

Dispensaries =  $86/127 * 49 = 33$

Health centres =  $41/127 * 49 = 16$

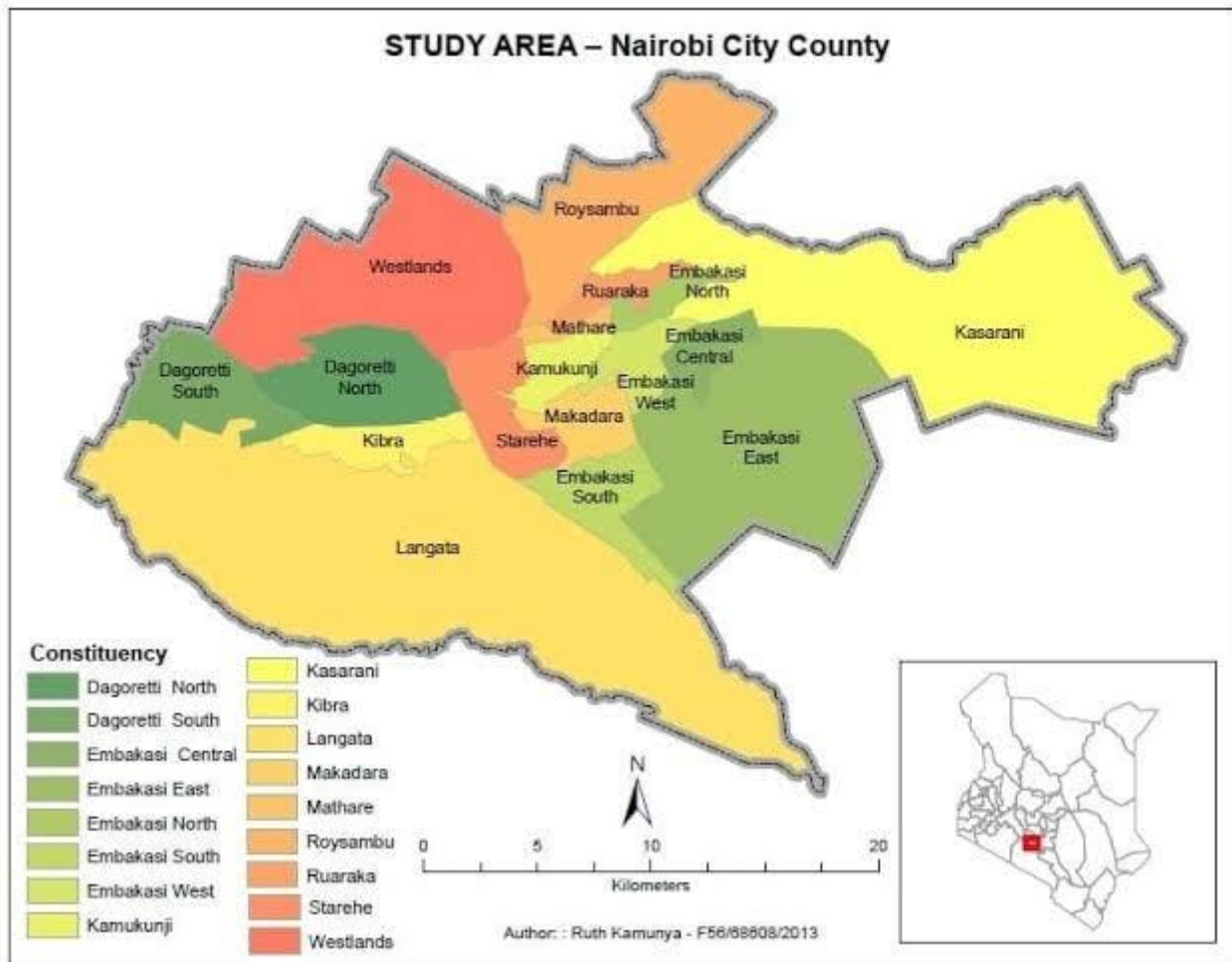
Based on stratification **dispensaries** were **33** and **health centres** were **16**.

Step 4. Random sampling was done to come up with 33 dispensaries and 16 health centres, 49 facilities

A sampling of the health care workers

Step 1: In each of the selected 49 facilities after excluding staff on annual leave during the study period, a list of all staff per cadre was drawn.

Step 2: The list was combined for each cadre in the 49 facilities in the six different Sub counties. Random sampling was then done as a group proportional to the cadre employed.



**Map showing Nairobi sub counties**

### **3.4 Sample size for HCWs**

The Kenya MOH Norms and Standards guidelines on human resource state that the ideal number of staff in a dispensary are 2 general clinical officers, 4 enrolled community health nurses, 2 registered community health nurses and 2 enrolled nurses. In a Health centre, there should be 2 medical officers, 6 clinical officers, 12 enrolled community health nurses, 8 registered community health nurses and 4 enrolled nurses(29). The total number of staff eligible by staff list in the 49 health facilities was 478 HCWs.

Fisher's formula with finite correction population was used to calculate sample size based on the assumption that 38% of HWs working in primary healthcare facilities had good knowledge and attitude on breastfeeding and complementary feeding from the data of Ramos *et al* in Brazil(15). This study was used because it looked at both knowledge and attitude of health workers working in primary health facilities hence similar to this study.

$$n = \frac{N * Z^2 * p (1 - p)}{d^2(N - 1) + Z^2 * p (1 - p)}$$

N= Total number of clinicians, nurses and nutritionists working within the selected health facilities (study population) = 478

P = Proportion of healthcare providers estimated to have good knowledge on complementary feeding which is estimated at 38% from a study conducted Brazil by Ramos AE *et al* on HWs knowledge and attitude on breastfeeding and supplementary feeding(33)

Z = Normal standard deviate for 95% confidence interval (1.96)

d = Desired precision level set at 5% (0.05)

Where:

$$n = 224 \text{ health workers}$$

The estimated sample size was 224 health workers.

### 3.6 Study tools

A structured questionnaire was used to assess the HCWs knowledge and attitude on complementary feeding. This questionnaire used modified questions that had been employed in similar studies used to assess HCWs knowledge and attitude on IYCF guidelines and also questions from UNICEF training module of HCWs on IYCF(15)(24)(33)(34). The questions were in keeping with WHO recommendation on Complementary feeding indicators. Knowledge of IYCF was evaluated using questions that focused on an essential understanding of the principal indicators of IYCF and the 10 guiding principles as detailed in the introduction. It covered the knowledge and attitude on complementary feeding. It was administered to the health workers in the dispensaries and health centres. Each question had only one correct answer. It captured socio-demographic details and **questions of interest** , and each questionnaire used a serial number for participant identification.



### **3.7 Study procedure**

#### **3.7.1 Recruitment**

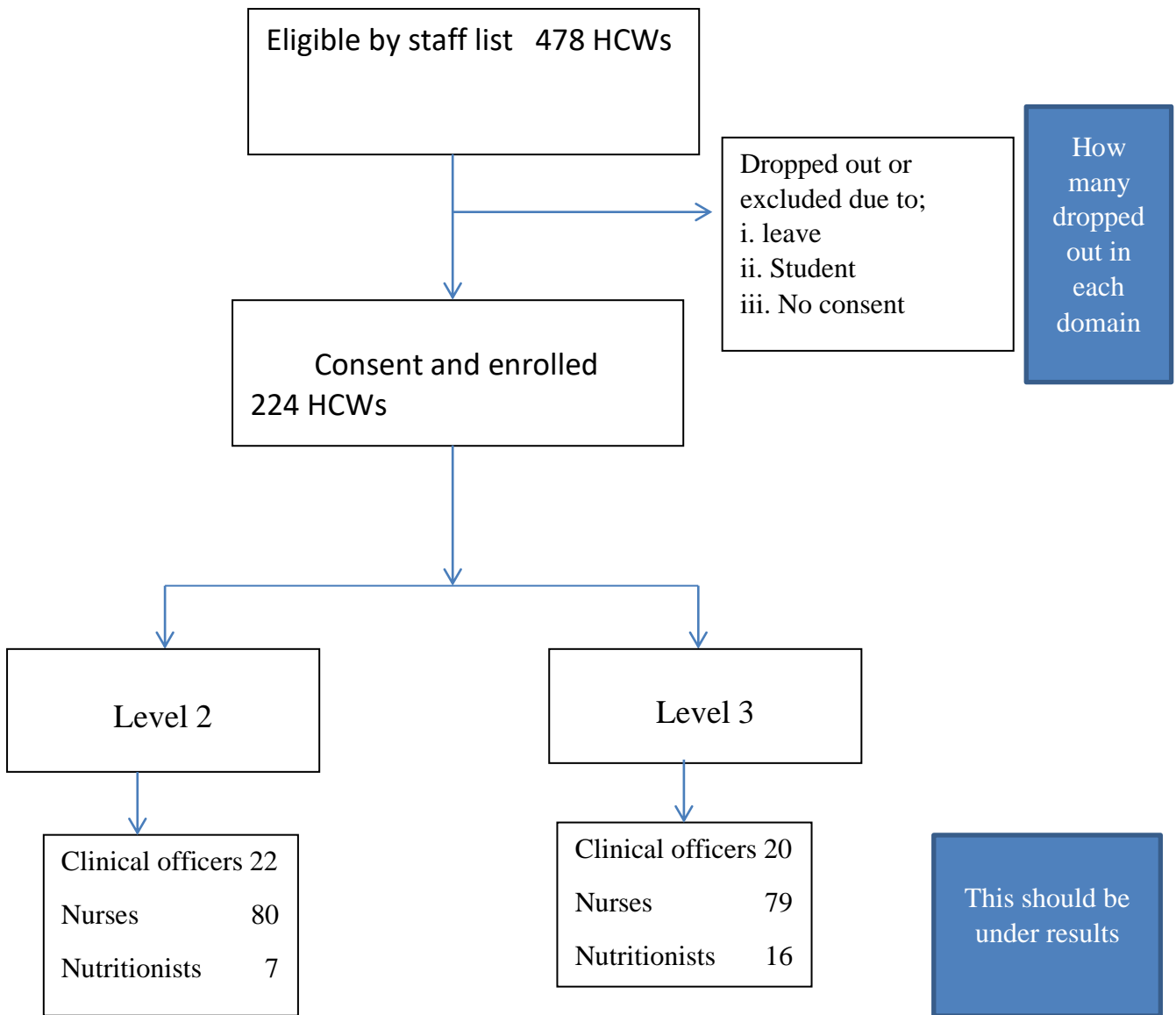
Approval from the University of Nairobi-Kenyatta National Hospital Ethics and Research Committee and Nairobi County Ministry of Health was sought. Once the relevant approval had been obtained, sampling was done as outlined in the sampling method, and potential study participants were identified using the inclusion criteria. **Research assistants were engaged and had been provided with further training in research and ethics.** Introduction of the study was done to the facility in-charges who advised on the best time to conduct the interviews in the facilities. The participants were briefed on the study, its purpose and information about safeguarding the participant's privacy and sharing of the study findings.

#### **Data collection methods**

The participants were then given the self-administered questionnaires once they gave consent. Once the questionnaire was filled, it was then given to the research assistant. The questionnaire was filled and returned on the same day.

#### Validity and reliability of tools

Validity is the ability of a tool to measure the constructs it is intended to measure. The tool was shared with supervisors and expert statistician and nutritionist to ensure validity. Reliability is related to the consistency of information obtained from the tool. To ensure the reliability of the tool, a small-scale pilot was conducted and reliability tests done. A reliability coefficient of more than 0.7 was considered adequate. The pilot was done amongst HCWs in facilities different from those chosen for the study but in the same locality. A total of 4 facilities were randomly selected, and a total of 20 HCWs (10% of the study population) were selected for the pilot study.



**Figure 3. 1 Screening and enrolment of HCWs**

## Data management and analysis

### 3.7.2 Data Management

Completed questionnaires were crosschecked for inconsistencies, inaccuracy, and missing data. The filled questionnaires were locked inside a cabinet accessible only by the principal investigator. Data were entered into a password-protected Microsoft Excel spreadsheet, then

exported to IBM SPSS version 24 for cleaning and analysis. All generated data sets were backed up in a password protected hard drive. Only the statistician and the lead investigator had the password. Any identifying information from the consent forms was stored separately in a locked cabinet with access limited to the lead investigator.

### **3.73 Variables**

Dependent variable

The dependant variables were:

- The knowledge of complementary feeding by HCWs
- Attitudes of HCW towards complementary feeding

Independent variable

Sociodemographic characteristics such as age, sex, professional cadre, the number of working year's post-basic training and facility type.

### **3.74 Data analysis**

Descriptive statistics was used to summarize the total scores for knowledge and attitude. The total scores for knowledge from the HCWs **questionnaire was acquired** and expressed as frequency and percentages. Knowledge was then graded as poor <50%, good knowledge (50-64%) very good knowledge (65-74%) and excellent knowledge above 75%. This grading score is similar to that used in the study done in Brazil(17) and the study in Ghana(34). Attitude was summarized with variables generated from the Likert scale tool with rating values ranging from strongly agree (coded as 5) to strongly disagree (coded as 1) and expressed as median and interquartile range.

A knowledge index score was generated for the 24 questions and to establish whether knowledge levels of complementary feeding differed across various demographic information such as age, gender, marital status, training level, years worked after basic training, and attending training on complementary feeding, a binary logistic regression was performed. All factors with p-value <0.05 were entered in a multivariable logistic regression model and their odds ratio of good knowledge compared to poor knowledge.

To describe the factors associated with good attitude towards complementary feeding, an attitude index score for the 6 questions was generated, the totals were then summed, and the attitude index was graded as negative for scores 1 and 2, neutral for score 3 and positive for score 4 and 5. A binary logistic regression was performed to establish whether the socio-demographic characteristics of the HCWs influenced their attitude towards complementary feeding. All factors with a p-value  $<0.05$  were entered in a multivariable logistic regression model and their odds ratio of positive attitude was compared to negative attitude.

### **3.8 Study results dissemination plan**

The study results will be submitted to the Department of Pediatrics and Child Health, the University of Nairobi as part of the requirements of the Master's Program in both hard and soft copies. Hard copies of the study will be sent to the University of Nairobi repository for storage. The findings will also be submitted for publication in peer-reviewed scientific journals. The results will also be submitted for presentation in scientific meetings and conferences. The findings will also be presented to the Nairobi County Health Management Team and the hospital administration in the recruited facilities as feedback.

### **3.9 Ethical considerations**

1. The approval for the study was obtained from the UoN-KNH ERC, Nairobi County – Ministry of Health (Annex approval).
2. A written informed consent explaining the details, procedures and protocols of the study was obtained from health workers before enrollment.
3. Only participants who gave consent will be enrolled in the study
4. Participants were informed of the voluntary nature of participation, and they could sideline themselves from the study at any time without being disadvantaged.
5. To ensure confidentiality, no participants personal identifiers were used, and participants were issued with unique identification codes.
6. The computer used for data entry and analysis was protected using a password and heavy encryption. The completed questionnaire was under lock and key, and the computerized data was password protected.
7. After the collection of data and analysis, **Continuous Medical Education (C.M, E)** will be Conducted in facilities that have poor knowledge.

## CHAPTER FOUR: RESULTS

The study included 224 healthcare workers in Nairobi County.

### 4.1 Background Information of HCWs

A total of 224 of HCWs participated in the study with a minimum age of 23 and a maximum age of 57 with a mean age of 38.4 years and a standard deviation of 10.1. Approximately half of the HCWs were between the ages of 30 -44 years at 49%. HCWs less than 30 years were the least at 22%. Majority of the respondents were females (165/224, 74%). In regards to marital status, majority were married at 74%, those single were 23% and 3% were separated/divorced. In terms of cadre, nurses were the majority at 71% (n=159) with those having a diploma at 62 % (n=159) and those with a certificate at 9% (n=159). Clinical officers were 19% (n=42) and nutritionists were the least at 10% (n=23). The HCWs who had attended a training on complementary feeding stood at 43%. As regards to years worked after basic training, 50% of the HCWS had worked for 10 years or less with 27% (n=60) having worked for 5 years or less and 23% (n=52) having worked between 6-10years. The summary is presented in the table below.

**Table 4. 1. Socio-demographic characteristics of Health Care Workers**

Socio-demographic characteristics	N=224	%
<b>Age in years</b>		
<30	50	22
30-44	109	49
45+	65	29
Mean Age=38.4,SD =10.1		
<b>Gender</b>		
Male	59	26
Female	165	74
<b>Marital Status</b>		
Single	51	23

Married	165	74
Separated/Divorced	6	3
<b>Training Level</b>		
Clinical Officer	42	19
Enrolled Nurse	20	9
Registered Nurse	139	62
Nutritionist	23	10
<b>Years worked after Basic training</b>		
1-5	60	27
6-10	52	23
11-20	59	26
21-30	39	18
31-40	14	6
<b>Attended training on complementary feeding</b>		
No training	126	57
One Training	46	21
Two or more Training	49	22
<b>HCWs enrolled in sub counties</b>		
Embakassi East	31	14
Kibra/Langata	63	28
Ruaraka	47	21
Starehe	61	27
Westlands	22	10
<b>Facility type</b>		
Level 3	115	51
Level 2	109	49

#### 4.2 Knowledge on complementary feeding

Various aspects on complementary feeding were assessed in this study. Knowledge on duration of exclusive breastfeeding and initiation and frequency of complementary feeding was assessed. The nutrient content of complementary feeds and hygiene and handling of the feeds was also assessed.

#### 4.2.1 Knowledge of HCWs on duration of Exclusive Breastfeeding and Timely Initiation of Complementary Feeding

Majority of the HCWs at 92.9% knew that complementary foods need to be introduced after 6 months of age. Majority of HCWs at 93% also knew that the duration of exclusive breastfeeding should be 6 months and 83% knew that breastfeeding should be initiated within the first hour of life. 75.5% agreed that that breastfeeding for 2 years or longer helps a child develop and grow healthy. 60% and 65% respectively agreed that eggs and flesh foods can be introduced between 6-11 months. The summary is presented in the table 4.2 below.

**Table 4. 2 Knowledge of HCWs on excusive breastfeeding and timely initiation of complementary feeds**

<b>Variable</b>	<b>n=224</b>	<b>%</b>
<b>Recommended breastfeeding duration for an infant</b>		
6-11 months	17	8
12-18 months	19	9
18-23 months	39	17
24 months and beyond	147	66
<b>Maximum storing time at room air for expressed breast milk</b>		
less than 2 hours	21	10
4-6 hours	152	70
over 6 hours	44	20
<b>Age to introduce complimentary feeding</b>		
less than 6 months	5	2
6-7 months	208	93
After 7 months	11	5
<b>Age to introduce dairy products</b>		
less than 6 months	2	1
6-11 months	150	67
Over 12 months	72	32
<b>Age to introduce water and other liquids</b>		
less than 6 months	5	2
6-11 months	213	96
over 12 months	4	2
<b>Age to introduce Eggs</b>		
6-11 months	135	61
over 12 months	87	39
<b>Age to introduce flesh food</b>		
less than 6 months	1	1
6-11 months	146	66
over 12 months	74	33

#### 4.2.2 Knowledge of HCWs on the frequency and amount of complementary foods

In regards to recommended feeding frequency majority of the HCWs had good knowledge. In relation to feeding 88% of the HCWs knew that children 6-8 months, need to be fed 2 or more meals, 92% knew that children 9-23 months need to be fed 3 or more meals. For the non-breastfed children aged 6-23 months, 86% of the HCWs knew that they should have 4meals or more per day and 84% knew that they should receive milk or milk products twice or more daily. Majority of the HCWs at 71% agreed that a growing child needs increased food and 65% agreed that during illness children need to be encouraged to eat and drink. This is presented in the table 4.3 below.

**Table 4. 3 Frequency of complementary feeds**

<b>Frequency of complementary feeds</b>	n=224	%
<b>Frequency of complementary feeds for breastfeeding children</b>	Number of correct responses	%
Between 6-8 months	199	89
9-23 months	206	92
<b>In a non-breastfed child between 6-23 months</b>		
Frequency of complementary feeds	194	87
Frequency of feeding milk and milk products	190	85
<b>Frequency of food groups to consume daily</b>	150	67
Aggregate knowledge on frequency of complementary foods( <b>mean</b> )		<b>84</b>

#### 4.2.3 Knowledge of HCWs on the Nutrient Content of Complementary Food

The study found that 66% of HCWs knew that children should be fed a minimum of 4 out of the 7 food groups daily. In regards to the nutritive value of food, there were varied responses. On being able to identify iron rich foods, 85% correctly identified liver as iron rich food whereas



only 39% identified spinach as iron rich food. As for to vitamin A rich food, 66% and 41% identified pumpkin and sweet potato respectively and 41% identified oranges as vitamin A rich fruit. In regards to foods that enhance iron absorption, 46% identified citric fruits like lemons and oranges as such foods and 43% agreed that adding oils to food is a good way of increasing energy value. The summary is presented in the table 4.4 below.

**Table 4. 4 Nutrient Content of Complementary Food**

<b>Type of feeds with micronutrients. Knowledge of 2 foods</b>	<b>n=224</b>	
	<b>No of correct answers</b>	<b>%</b>
Iron rich foods	140	63
Enhancers of iron absorption	97	44
Vitamin A rich foods	121	54
Aggregate knowledge on micronutrient content of food( <b>mean</b> )		<b>54</b>

#### **4.2.4 Knowledge of HCWs on food hygiene and handling**

Majority of HCWs at 88% knew that mothers should wash their hands with soap before breastfeeding and 58% of the HCWs knew that it was important to cover food with a lid while feeding. Majority at 67% reasonably agreed that fresh cow milk should be boiled before feeding the child. However only 34% agreed that cooked foods need to be reheated thoroughly. The summary is in the table 4.5 below.

**Table 4. 5 Food hygiene and handling**

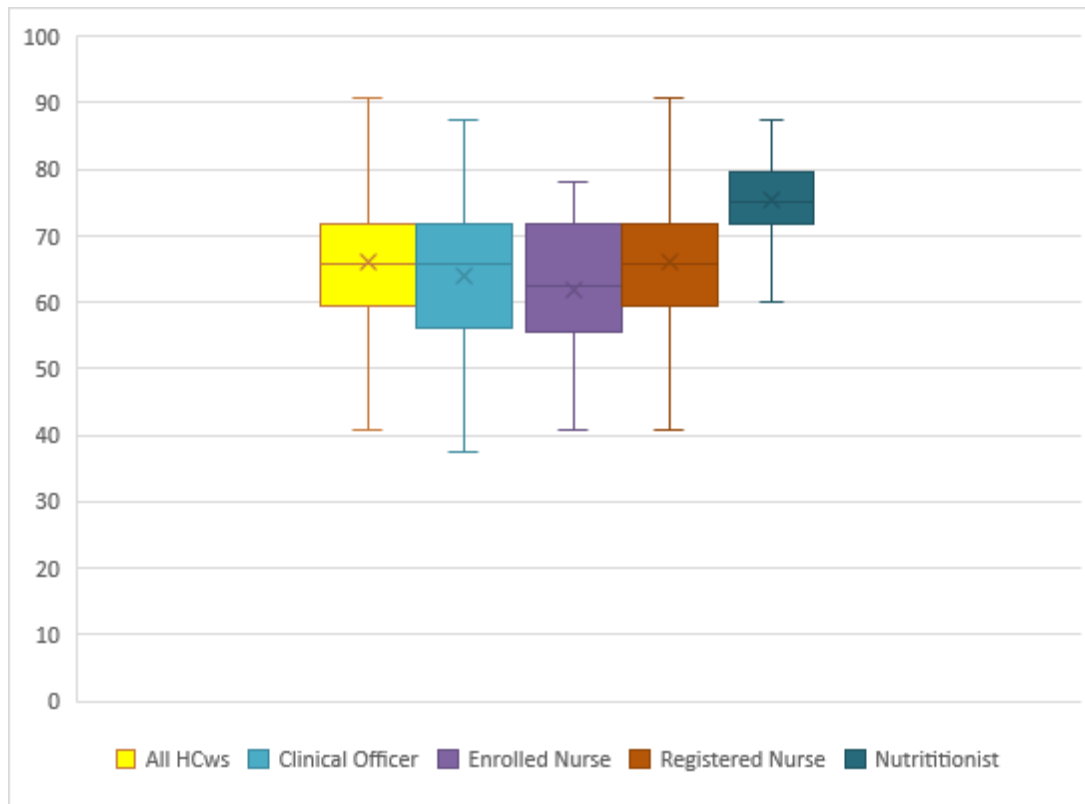
<b>Good hygiene and food preparation practices:</b>	<b>N=224</b>	<b>%</b>
	<b>No of correct responses</b>	<b>%</b>
Use a cup with a lid	92	41
Hand washing before breastfeeding	201	90
Fresh cow milk should be boiled	150	67
Cooked foods should be reheated thoroughly	78	35
Complementary foods need not to have different ingredients to family foods	65	29
Adding oil to food is a good way to increasing energy levels	96	43
Aggregate Knowledge on food preparation and handling( <b>mean</b> )		<b>51</b>

#### 4.2 The knowledge of Health care workers in Nairobi Sub County

This study found that the mean score for all HCWs was 66% with the minimum score of 37% and a maximum score of 91%. Knowledge was graded as poor (< 50%), good knowledge (50-64) very good knowledge (65-74%) and excellent knowledge at 75% and above. This is similar to the study done by Christiana *et al* who used a similar grading system in Ghana. The data showed that 48 % had good knowledge,14.7% had average knowledge and 37.1% had poor knowledge. The scores were significantly significant between cadres ( $p < 0.05$ ) with nutritionists having the highest level of knowledge with a mean of 75% with the highest score being 88% and the lowest score being 60%. Enrolled nurses had a mean score of 61% whereas registered nurses had a mean score of 66% A Clinical officers had a mean of 64%, with the least score at 37% and the highest score at 87%. The summary is presented in the figure 4.1 below.

**Table 4. 6 Summary of overall comprehension scores of Health Workers.**

75% and above –Distinction-Excellent knowledge	75	34
65-74% - Credit-Very good knowledge	81	37
50-64% -Pass –Good knowledge	49	21
<50% -Fail-poor knowledge	19	8
Mean score	<b>66</b>	



**Figure 4. 1 Knowledge of HCWs on Complementary Feeding**

#### **4.3 Attitude of Health care workers on complementary feeding**

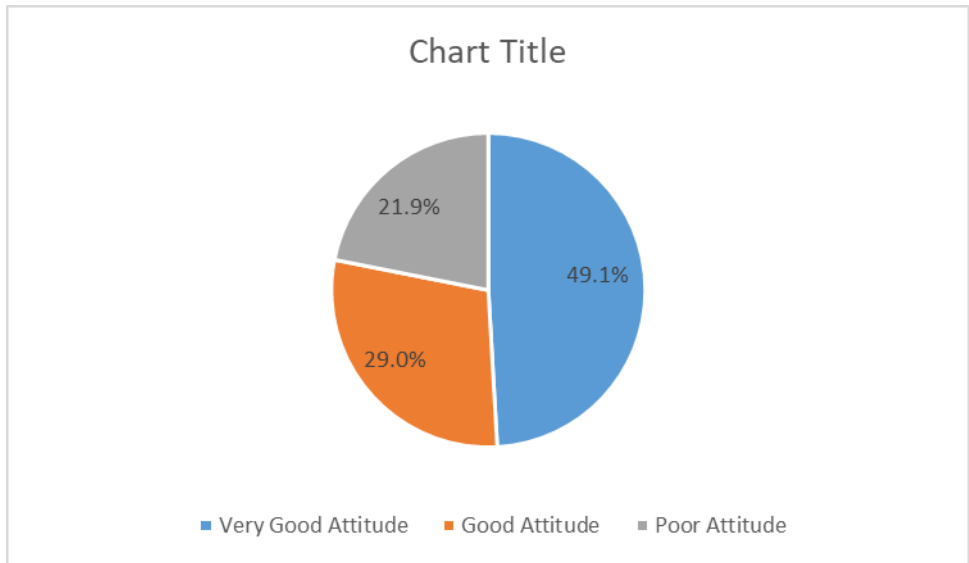
The respondents were asked the extent of agreement on with statements regarding breastfeeding and complementary feeding practices in Nairobi County. The attitude questions were 6 in total. The questions were asked and rated on a Likert scale ranging from strongly disagree (1) to strongly agree (5). On average, there was positive attitude towards some of the questions. The respondents agreed that it is possible for babies to breastfed on demand with 93.3% having a very good attitude (median of 5). The HCWs agreed that it is possible for working mothers to express milk at work with 91% having a very good attitude (median=5). The HCWs agreed that it was possible for mothers to breastfed their children for up to two years and beyond with 93.7% having a very good attitude (median=5) and that it was possible to feed a child 4 out 7 food groups with 82% having a very good attitude (median=4). Moreover, a majority of the HCWs disagreed with the statement that that it was not possible for mothers to wait up to 6months to start complementary feeds with 68.3% having a negative attitude (median=2). Finally, majority of the HCWs at 90.1% had a negative attitude towards the statement that boys were not satisfied by breastfeeding, hence the need to introduce complementary feeds early(median=1)

Table 4. 7a Attitude Descriptive

	Negative Attitude	Good Attitude	Very good Attitude	Median	Q1	Q3	IQR(Q3-Q1)
Score Frequency	Score 1-2 n(%)	Score 3 n(%)	Score 4-5 n(%)				
Babies should be breastfed on Demand	14(6.2%)	1(0.5%)	209(93.3%)	5	5	5	0
It's possible for working mothers to express milk at work	8(3.6%)	12(5.4%)	204(91.0%)	5	4	5	1
It's possible for mothers to breastfed children for up to 2 years and beyond	8(3.6%)	6(2.7%)	210(93.7%)	5	4	5	1
It's possible for children to be fed 4 out of 7 groups	23(10.3%)	16(7.1%)	185(82.6%)	4	4	5	1

Table 4. 7b Attitude Descriptive

	Negative Attitude	Good Attitude	Very good Attitude	Median	Q1	Q3	IQR(Q3-Q1)
Score Frequency	Score 4-5 n(%)	Score 3 n(%)	Score 1-2 n(%)				
It's not possible for mothers to wait up to 6months to start complimentary feeds	153(68.3%)	11(4.9%)	60(26.8%)	2	1	4	3
Boys are not satisfied by breastfeeding	201(90.1%)	10(4.5%)	12(5.4%)	1	1	2	1



**Figure 4. 2 A pie chart showing the distribution of healthcare workers attitudes towards complementary feeding**

**4.4 Univariate analysis of Complementary Feeding Knowledge index against socio-demographic characteristics**

Table 4.8 below shows the results of the univariate analysis of complementary feeding knowledge index of HCWs against the socio-demographic characteristics. The analysis results show that the training level and sub county were factors significantly associated with knowledge of complementary feeding practices.

**Table 4. 8 Univariate analysis of complementary feeding knowledge index against socio-demographic characteristics**

<b>Socio-Demographic Characteristic</b>	<b>Good Knowledge (n=141) (&gt;50%)</b>	<b>Poor Knowledge (n=83)(&lt;50%)</b>	<b>Crudes Odds Ratio(95% CI)</b>	<b>P-Value</b>
<b>Age</b>				
<30	26(52.0)	24(48.0)	1(Ref)	
30-44	74(67.9)	35(32.1)	1.95(0.98-3.87)	0.056
45-53	41(63.1)	24(36.9)	1.58(0.75-3.34)	0.234
<b>Gender</b>				
Male	31(52.5)	28(47.5)	0.55(0.30-1.01)	0.055
Female	110 (66.7)	55(33.3)	1(Ref)	
<b>Marital Status</b>				
Unmarried	36(63.2)	21(36.8)	1(Ref)	
Married	103(62.4)	62(37.6)	0.97(0.52-1.81)	0.921
<b>Training Level</b>				
Enrolled Nurse	9(45.0)	11(55.0)	1 (Ref)	
Registered Nurse	89(64.0)	50(36.0)	2.18(0.84-5.61)	0.108
Clinical Officer	22(52.4)	20(47.6)	1.34(0.46-3.92)	0.587
Nutritionist	21(91.3)	2(8.7)	12.8(2.35-70.04)	<b>0.003</b>
<b>Years Worked after Basic Training</b>				
1-5	38(63.3)	22(36.7)	1 (Ref)	
6-10	36(69.2)	16(30.8)	1.30(0.59-2.87)	<b>0.041</b>
11-20	35(59.3)	24(40.7)	0.84(0.40-1.77)	0.653
21-40	30(62.5)	18(37.5)	0.96(0.44-2.12)	0.929
<b>Attended training on Complementary Feeding</b>				
No Training	78(61.9)	48(38.1)	1 (Ref)	
One Training	30(65.2)	16(34.8)	1.15(0.57-2.34)	0.691
2 or more trainings	31(63.3)	18(36.7)	1.06(0.54-2.10)	0.868
<b>Sub County for Health Facility</b>				
Embakasi East	14(45.2)	17(54.8)	1 (Ref)	
Kibra/Langata	37(58.7)	26(41.3)	1.73(0.73-4.11)	0.216
Ruaraka	30(63.8)	17(36.2)	2.14(0.85-5.40)	0.106
Starehe	42(68.9)	19(31.2)	2.68(1.10-6.54)	<b>0.030</b>
Westlands	18(81.8)	4(18.2)	5.46(1.50-19.93)	<b>0.010</b>
<b>Facility Type</b>				
Level 2	69(63.3)	40(36.7)	1 (Ref)	
Level 3	72(62.6)	43(37.4)	0.97(0.56-1.67)	0.914

Statistical Test-Logistic regression model

#### 4.4.1 Multivariable logistic regression model of complementary feeding knowledge index against socio-demographic characteristics

In the multivariable analysis it was noted that being a nutritionist had an increased probability of having good knowledge of complementary feeding compared being a clinician (AOR=13.47, CI=2.39-75.93), P=0.003). Having worked for 11 to 20 years had an increased probability of having good knowledge on complementary feeding compared to those who had worked between 1 to 5 years (AOR=0.23, CI=0.06-0.96, P=0.043). The sub county where the HCWs worked was also associated with an increased probability of having good knowledge with Starehe Sub County having increased probability of good knowledge compared to Embakassi East (AOR3.13, CL=1.24-7.93 P=0.016) and Westlands Sub county having increased probability of having good knowledge (AOR=5.15, CLI1.35-19.59 P=0.016)

**Table 4. 9Multivariable logistic regression model of complementary feeding knowledge index against socio-demographic characteristics**

Socio-demographic Characteristics	Good Knowledge (n=141) (>50%)	Poor Knowledge (n=83)(<50%)	Adjusted Odds Ratio(95% CI)	P-Value
<b>Training Level</b>				
Enrolled Nurse	9(45.0)	11(55.0)	1(Ref)	
Registered Nurse	89(64.0)	50(36.0)	2.35(0.89-6.21)	0.084
Clinical Officer	22(52.0)	20(48.0)	1.35(0.46-4.01)	0.587
Nutritionist	21(91.0)	2(9.0)	13.47(2.39-75.93)	<b>0.003</b>
<b>Years worked after basic training</b>				
1-5	38(62%)	20(48%)	1(Ref)	
6-10	36(69%)	16(31%)	0.89(0.32,2.45)	<b>0.043</b>
11-20	35(59%)	24(41%)	0.23(0.06,0.96)	0.824
21-30	23(68%)	11(32%)	0.13(0.02,1.01)	0.052
31-40	7(50%)	7(50%)	0.08(0.01,1.02)	0.052
<b>Sub County For Health Facility</b>				
Embakasi East	14(45.0)	17(55.0)	1(Ref)	
Kibra/Langata	37(59.0)	26(41.0)	1.89(0.78-4.67)	0.166
Ruaraka	30(64.0)	17(36.0)	2.59(0.98-6.82)	0.054
Starehe	42(69.0)	19(31.0)	3.13(1.24-7.93)	<b>0.016</b>
Westlands	18(82.0)	4(18.0)	5.15(1.35-19.59)	<b>0.016</b>

#### 4.4.2 Univariate analysis of Attitude of Health Care Workers against socio-demographic characteristics

The univariate analysis of attitude index against socio-demographic characteristics showed that marital status and cadre were significant factors associated with positive attitude of health care workers on complementary feeding as shown in table 4.10 below.

**Table 4. 10 Univariate analysis of attitude index against socio-demographics**

<b>Socio-Demographic Characteristic</b>	<b>Good Attitude</b>	<b>Poor Attitude</b>	<b>Crudes Odds Ratio (95% CI)</b>	<b>P Value</b>
<b>Age</b>				
<30	20(40.0%)	30(60.0%)	1(Ref)	
30-44	51(46.8%)	58(53.2%)	1.32(0.66-2.60)	0.425
45-60	39(60.0%)	26(40.0%)	2.25(1.06-4.78)	<b>0.035</b>
<b>Gender</b>				
Male	27(45.8%)	32(54.2%)	0.83(0.46-1.51)	0.55
Female	83(50.3%)	82(49.7%)	1(Ref)	
<b>Marital Status</b>				
Unmarried	25(43.8%)	32(54.2%)	1(Ref)	
Married	83(50.3%)	82(49.7%)	1.30(0.71-2.37)	0.402
<b>Training Level</b>				
Enrolled Nurse	13(65.0%)	7(35.0%)	1(Ref)	
Clinical Officer	14(33.3%)	28(66.7%)	3.71(1.21-11.4)	<b>0.022</b>
Registered Nurse	68(48.9%)	71(51.1%)	1.92(0.93-3.95)	0.078
Nutritionist	15(65.2%)	8(34.8%)	3.75(1.28-10.95)	<b>0.016</b>
<b>Years Worked after Basic Training</b>				
1-5	28(46.7%)	32(53.3%)	1(Ref)	
6-10	26(50.0%)	26(50.0%)	1.14(0.54-2.40)	0.725
11-20	23(39.0%)	36(61.0%)	0.73(0.35-1.51)	0.398
21-40	31(64.6%)	17(35.4%)	2.08(0.96-4.54)	0.065
<b>Attended training on Complementary Feeding</b>				
No Training	64(50.8%)	62(49.2%)	1.17(0.60-2.26)	0.647
One Training	21(45.7%)	25(54.4%)	0.95(0.42-2.13)	0.900
2 or more trainings	23(46.9%)	26(53.1%)	1(Ref)	
<b>Sub County for Health Facility</b>				
Embakasi East	13(41.9%)	18(58.1%)	1(Ref)	
Kibra/Langata	35(55.6%)	28(44.4%)	1.73(0.73-4.13)	0.216
Ruaraka	23(48.9%)	24(51.1%)	1.33(0.53-3.31)	0.544



Starehe	25(41.0%)	36(59.0%)	0.96(0.40-2.31)	0.930
Westlands	14(63.6%)	8(36.4%)	2.42(0.79-7.46)	0.123
<b>Facility Type</b>				
Level 2	52(47.7%)	57(52.3%)	1(Ref)	
Level 3	58(50.4%)	57(49.6%)	1.12(0.66-1.88)	0.683

Statistical Test- Logistic regression model

#### 4.43 Multivariable logistic regression model of complementary feeding attitude index against sociodemographic characteristics.

In the multivariable analysis shown in table 4.7 below, marital status and training level were significant factors associated with attitude of HCWs on complementary feeding. Being married, was significantly associated with having a good attitude towards complementary feeding (OR=2.17, CI=1.12-4.22, P=0.022) on complementary feeding compared to those who are single and being a nutritionist had an increased odd of having a good attitude towards complementary feeding versus neutral or poor attitude of complementary feeding compared to being a clinician.

**Table 4. 11 Sociodemographic characteristics associated with attitude using multivariable analysis**

Socio-demographic Characteristics	Good Attitude	Poor Attitude	Adjusted Odds Ratio(95% CI)	P value
<b>Age</b>				
<30	20(40.0%)	30(60.0%)	1(Ref)	
30-44	51(46.8%)	58(53.2%)	1.71(0.83-3.53)	0.149
45-60	39(60.0%)	26(40.0%)	2.52(1.11-5.73)	<b>0.027</b>
<b>Training Level</b>				
Enrolled Nurse	13(65.0%)	7(35.0%)	2.86(0.88-9.33)	0.081
Clinical Officer	13(30.9%)	29(69.1%)	1(Ref)	
Registered Nurse	67(48.2%)	72(51.8%)	1.92(0.92-4.02)	0.082
Nutritionist	15(65.2%)	8(34.8%)	4.80(1.55-14.85)	<b>0.006</b>

## CHAPTER FIVE: DISCUSSION

This study assessed the HCWs knowledge and attitude toward complementary feeding. The HCWs were assessed on food groups, vitamin and mineral content of food, food hygiene and handling and the various factors that were associated with good knowledge on complementary feeding. Their knowledge level was assessed with regards to the guidelines on IYCF guidelines on complementary feeding. Knowledge on timely initiation of complementary foods, food groups and feeding frequency and dietary diversity were assessed. The attitude of HCWs was also assessed on various aspects of complementary feeding using the Likert scale.

Concerning responses on the daily feeding frequencies and the amount for the various age groups of infants using the WHO and UNICEF recommendations, the study found that 88% of the HCWs knew the right answers. This is higher in comparison to a study by Hawa *et al*(35) in Garissa county where only 47.2% of the HCWs provided the right answers. A study intervention for HCWs done by Samuel *et al*(24) for 4 weeks, found that only 37% of the respondents answered correctly. This is significant because wrong information on food frequency and amounts to mothers will lead to the replacement of breastfeeding by other foods and increased risk for early stoppage of breastfeeding. As pertains to meal frequency in children who are not breastfed aged 6-23 months, 86% of the HCWs knew that the children should receive 4 or more meals daily. This was similar to a study by Mostafa *et al*(16) which showed that 75% of the HCWs knew the correct answer and significantly higher than a study by Christiana *et al* which showed that only 6.8% of the HCWs knew the correct meal frequency. With regards to the frequency of receiving milk and milk products in children aged between 6-23 months, 84% of the HCWs knew that the children should receive milk and milk products twice or more daily. This was significantly higher than the study by Christiana *et al* which showed that only 9.9% of the HCWs knew the correct response. This is important as growing children need adequate dairy products to enable them meet their daily calcium requirements for their growth and thus HCWs are in a position to give advice to the caregivers of children who are orphans or children who decided to stop breastfeeding on their own.

### **5.1.1 Food groups**

The responses of the HCWs concerning food groups and food items that contain vitamin A, iron and calcium were varied. The study found that 66% of HCWs knew that infants should receive 4 or more food group. This was higher when compared to the study by Hawa *et al*(35) who find out that only 27.8% and only 19.4% could mention the 7 food groups. This finding was similar to what Samuel *et al* (18) reported in his study in terms of prior knowledge of 7 food groups which was at 58.4% at baseline but improved to 90.9% 4 weeks post-training on complementary feeding. Of note 55.6% of HCWs were conversant with the old groups that are carbohydrates vitamins and protein and some added water as a group. In terms of essential elements 66.5% could mention a vitamin A rich food. Christiana *et al* (33) found that 37% of HCWs could name one vitamin A rich food. In the KDHS study of 2014 (36), 72% of children aged 6-23 months had ingested foods rich in Vitamin A the day before the study. Vitamin A is an essential micronutrient playing a vital role in maintenance of the epithelial tissues of the body and promoting a strong immunity. Severe vitamin A deficiency leads to conjunctival damage and it can also lead an increase in the severity of infections such as diarrhoeal diseases, measles and slow recovery from illness. (36).

### **5.1.2 Vitamin and mineral content of food**

When it came to iron rich foods 85% were able to list flesh foods as being rich in iron yet only 39% were able to list dark green leafy vegetable example spinach as being rich in iron. In the study by Hawa *et al* study 38.9% were able to mention three food types rich in iron whereas only 24% could name three iron rich foods in the study by Anurag *et al*. In contrast a study done by Christina *et al* found that only 7.3% could name one iron rich food. In regards to identifying foods that enhance iron absorption, 46% were able to list one type of food which greatly enhances iron absorption.

In the study by Hawa *et al*(35) 83% knew at least one food that enhances iron absorption. In the study by Christina *et al* only 16.2% of HCWs were able to identify one food that enhances iron absorption. In the study by Christina *et al* , it was observed that HCWs placed much emphasis on the consumption of food sources from plants such as dark green, leafy vegetables as compared to

animal sources. However they did but did not highlight the importance of consuming foods rich in vitamin C in order to enhance the absorption of iron from the leafy green vegetables. Ascorbic acid or vitamin C (found in citrus fruits like lemons, oranges, tangerine, grape fruit and lime) is the greatest absorption enhancer of non-heme iron. In the KDHS 2014(36) study 33% of children aged 6-23 months ingested foods rich in iron the day prior to the survey. Iron is critical for cognitive development, and reduced iron consumption contributes to anaemia. Iron demands are highest at age 6-11 months, when the when growth is especially expeditious.

### **5.1.3 Knowledge of HCWs**

Of the HCWs interviewed, 8% had poor knowledge (scored less than 50%), 21% had a pass (50-64%), 37% had very good knowledge (scored between 65-74%) and 34% had a distinction (scored above 75%). A study done by Hawa *et al* looked at HCWs knowledge and counselling services on complementary feeding in Garissa sub county. The study showed that 22% had very good knowledge and above and above (described as a good score) and 48% had a poor score. The study done by Christina *et al* looking at gaps in knowledge levels of HCWs on recommended child feeding practices in Ghana showed that 6.8% had grade B and above (described as a good score) and 41% had a poor score. Similar studies done by Utoo *et al* and Brewer *et al* showed that the levels of knowledge of HCWs on recommended key IYCF practices were deficient. A likely explanation for this poor outcome is that possibly there is minimal focus on nutrition education within the curricula used in pre-service training of HWs as affirmed in a previous study by Sunguya *et al* (32). He specifically highlighted that although students in medical training institutions viewed nutrition as an important constituent of their roles as proficient HCWs, they felt impaired by the lack of adequate education on nutrition, insufficient lecturers to teach on nutrition, poor collaboration with nutrition professionals, and inadequate application of nutrition science.

### **5.1.4 Factors associated with HCWs knowledge**

In the multivariable analysis of knowledge index, it was found that the knowledge score on complementary feeding was statistically significant with the years worked after basic training with those who had worked for less than 10 years having a higher score than the rest. Sondankar *et al* (37) found that HCWs who had worked for less than 5 years had better knowledge on child health services. The studies done with regard to the relationship between the working years

experience and their nutritional knowledge have not been consistent. Some researchers found a positive association while others found no association between HCWs knowledge on nutrition and the number of working years. The study by Christiana *et al*(33) revealed that an increased knowledge grade was not of statistical importance with the number of years worked as a professional. However, the study noted that a higher number (10 out of 13) of the HCWs who had a high grade had less years of work experience (1 - 4 years). This could be elucidated by the fact that HCWs with less experience could have recently finalized their training and therefore may have better memory on some information from their nutrition class. To the contrary, the more experienced HCWs most probably finalized their studies a while back and not updated their nutritional knowledge by participating in workshops or attending refresher courses. Additionally, the poorer scores of HCWs who had worked for a longer time could be attributed to the fact that their initiative to acquire and refresh their knowledge might have waned. Sharma *et al* indicated that younger HCWs who had short working experience were likely to be zealous to acquire up-to date information, grasp and incorporate and newly obtained information with ease and thus enhancing their nutritional knowledge.

The knowledge scores were significantly different between cadres with nutritionists having the highest score with a median of 75%. This is similar to a study by Hawa *et al*(35) done in Garissa showing the median of knowledge of nutritionists to be 73%. Christiana *et al* showed that the position of a HCW was statistically significantly associated with their level of knowledge. Nutritionists have an intense curriculum on infant and young child feeding practices while in training. Another reason that can be ascribed to this good knowledge is that nutritionists are often given the first priority to attend continuing or refresher nutrition education programmes on behalf of the facilities and later relay the knowledge learnt to the other members of staff hence acquiring more knowledge as indicated by Banwar *et al*(38). Another possible reason is the various professional backgrounds of the HCWs working at the Child clinics offering varying services. HCWs are more likely to concentrate on only their primary roles, for instance nurses will focus on growth monitoring, family planning, and antenatal issues while the clinicians will just treat manage the sick children and nutritionists are in charge of the nutrition clinic. This leads to failure to deliver comprehensive care that intergrates promotive, preventive and curative services. Thus anything regarding nutrition is left to the nutritionist available and this increases their expertise.

Finally, location of the health facility was important as facilities in 2 sub counties i.e. Westlands and Starehe had good knowledge. This might be attributed to more trainings and exposure in these facilities. Westlands is located in the upmarket segment of Nairobi County hence the patients in these facilities might have wider knowledge on matters of health and this trickles down to the facilities. However further studies are needed to look at the association between knowledge of HCWs and location of the health facilities.

#### **5.1.6 HCWs attitude towards complementary feeding**

In regards to attitude of HCWs 49% had very good attitude, 29% had good attitude and 22% had poor attitude. A study done by Ikobah *et al*(41) in Nigeria that showed that HCWs had 44% positive attitude toward infant feeding 3.1% had a negative attitude and 52.9% had a neutral attitude. This poses a problem to achieving optimum breastfeeding and complementary feeding practices amongst mothers as most of them look up to effective support from health workers. These finding agrees with studies in Hungary and Nigeria that showed the lack of proper awareness of infant feeding practices among HCWs as major obstacles toward good infant feeding practices. Regular retraining of HCWs is required especially through continuous medical education to prevent knowledge decay. On average, there was positive attitude towards some of the questions. In this study 93% of the HCWs agreed that it is possible for babies to start complementary feeds after 6 months. This is comparable to the study by Ikobah *et al* (41) who found HCWs had a 94% positive attitude towards initiation of complementary feeds after 6 months. Samuel *et al* had a training intervention for HCWs and found that 85% had a positive attitude before training and the attitude increased after training with 92% having a positive attitude after training. The HCWs in our study had a positive attitude towards breastfeeding for 2 years and beyond at 87%. This is significantly higher than the study by Maharashta *et al*(41) in India who found that only 17% of the HCWs had a positive attitude towards breastfeeding for 2 years and beyond.

Several studies have shown inconsistent results in regards to marital status with some showing a positive correlation and others showing no correlation. In this study the married HCWs had a positive attitude towards breastfeeding as compared to the single HCWs. Studies done by Ikobah

*et al*(41) and Davey *et al*(37) showing no correlation. In the study by Brewer *et al* it was noted that the nurses who had breastfed their children had positive attitude towards breastfeeding than those who had not breastfed their children. This is similar to a systematic review by Yang *et al*(19) who showed that there was a positive attitude in those married and those with a personal breastfeeding experience. It might be inferred from the study that the married are likely to have children and thus have had a personal breastfeeding experience thus having a positive attitude towards complementary feeding.

## **5.2 LIMITATIONS**

### **Study limitations**

Being a cross-sectional research design, this study can only describe factors associated with knowledge and attitude among HCWs. It cannot determine the link to the causality of the described factors. Another limitation is that this study only looks at public level 2 and 3 facilities in Nairobi County. This might not be representative of the other level 2 and 3 facilities in the County that are not publicly owned.

There was a lack of a valid tool to assess the knowledge and attitude of HCWs. The study was also carried out during a strike for HCWs of Nairobi County hence only those who were at work during the strike were interviewed. This might have introduced selection bias. It being a cross sectional studies it is unable to assess the practice over a period and might have caused bias. There may have been instances where the participants falsified information, which was beyond the control of the principle investigator.

## **5.3 CONCLUSION**

1. On knowledge and attitude of HCWs
  - i. There was good knowledge of the HCWs as the mean score was 66% and only 8% had poor knowledge (less than 50%) while 34% had a distinction (scored 75% and above
  - ii. Majority of the HCWs had good attitude with 78% having positive attitude and 22% having poor attitude.
2. Factors associated with good knowledge included
  - i. Professional Cadre with nutritionists having good knowledge
  - ii. Years worked after basic training with those who had worked for less than 10 years having good knowledge

- iii. Sub counties within which the health facilities were located being a factor with Westlands and Starehe Sub counties associated with good knowledge
3. Factors associated with good attitude included
- i. Professional Cadre with nutritionists having positive attitude
  - ii. Age with HCWs above 45 years having positive attitude.

#### **5.4 RECOMMENDATION**

It is recommended that the different cadres in healthcare should have refresher courses on complementary feeding as it is clear that nutritionists had the highest knowledge and positive attitude on complementary feeding. More studies are needed to ascertain the association between the different sub counties and the knowledge of the various HCWs working in those facilities.



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## APPENDICES

### APPENDIX I: BUDGET

#### Preliminary study budget

Item	Unit	Cost
Principal investigator	1	Nil
Research assistants	2	20000
Stationary		2000
Statistician	1	30000
ERC fee	1	2000
Printing and photocopying		5000
Telephone/airtime		3000
Publication/dissemination		20000
Miscellaneous		10000
Total		92,000



## **APPENDIX 4: CONSENT FORM**

### **STUDY TITLE: KNOWLEDGE AND ATTITUDES OF HEALTH WORKERS ON BREASTFEEDING AND COMPLEMENTARY FEEDING IN LEVEL 2 AND 3 HEALTH FACILITIES IN NAIROBI COUNTY**

This is a study to assess the knowledge and attitudes of healthcare workers on breastfeeding and complementary feeding in dispensaries and health centres in Nairobi County.

#### **Research Procedure:**

I am as a result of this requesting your support by participating in this research study. The purpose

of this consent form is to provide you with the information you will need to help you decide whether to participate in the study. This process is called 'Informed Consent'.

Please read this consent information carefully and ask any questions or seek clarification on any matter concerning the study with which you are uncertain.

#### **Process:**

I want to find out about your knowledge and attitudes towards breastfeeding and complementary feeding. A questionnaire will be given to you to get the relevant information

#### **Confidentiality:**

Your name and title will not be used in the questionnaire. It will only be used for the consent form, which will be kept separately from the questionnaire. A code number will appear on the record made of the observation, and only the research team will have access to the link between code numbers and individuals. No other research team will be allowed to see the records of the observation without your permission. The information obtained will not be used to report an individual worker's performance, and the report will be put as a whole, not individually.

#### **Benefits:**

There is no monetary benefit to participating in this research study. The results obtained from the research study will be used to highlight the knowledge gaps HWs in primary health facilities have, and this can be used to inform policy change.

#### **Risks:**

There will be no risks involved in you participating in this study.

Refusal to participate will not jeopardize your position as a health care worker.

#### **Voluntariness:**

The study is purely voluntarily.

One is free to participate or withdraw from the study at any point.

#### **Problems or Questions:**

Any queries about the study can be enquired from the **principal investigator DR. LYNN KIEMA 0726024900**. If you have any questions on your rights as a research participant, you can contact the Kenyatta National Hospital Ethics and Research Committee (KNH- ESRC) by calling 2726300 Ext. 44355.

**Certificate of Consent:**

I have read the foregoing information and have had the opportunity to ask questions about it, and any questions that I have asked have been answered to my satisfaction.

I consent voluntarily to participate in this research.

Name of Participant: \_\_\_\_\_

Signature of participant: \_\_\_\_\_

Date \_\_\_\_\_

Researcher's name: Dr Lynn Kiema

Researcher's signature: \_\_\_\_\_

Date \_\_\_\_\_

Append approval form ERC

## APPENDIX 5: ETHICAL APPROVAL



UNIVERSITY OF NAIROBI  
COLLEGE OF HEALTH SCIENCES  
P O BOX 19676 Code 00202  
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Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC  
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Website: <http://www.erc.uonbi.ac.ke>  
Facebook: <https://www.facebook.com/uonknh.erc>  
Twitter: @UONKNH\_ERC [https://twitter.com/UONKNH\\_ERC](https://twitter.com/UONKNH_ERC)



KENYATTA NATIONAL HOSPITAL  
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Ref: KNH-ERC/A/441

7<sup>th</sup> December 2020

Dr. Lynn Mwatha Kiema  
Reg. No.H58/12376/2018  
Dept. of Paediatrics and Child Health  
School of Medicine  
College of Health Sciences  
University of Nairobi



Dear Dr. Kiema

**RESEARCH PROPOSAL – KNOWLEDGE AND ATTITUDE ON COMPLEMENTARY FEEDING PRACTICES AMONG THE HEALTHCARE WORKERS IN LEVEL 2 AND 3 HEALTH FACILITIES IN NAIROBI COUNTY (P484/09/2020)**

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 7<sup>th</sup> December 2020 – 6<sup>th</sup> December 2021.

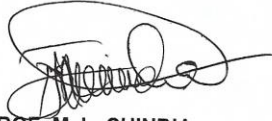
This approval is subject to compliance with the following requirements:

- a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- g. Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.



For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



**PROF. M. L. CHINDIA**  
**SECRETARY, KNH-UoN ERC**

- c.c. The Principal, College of Health Sciences, UoN  
The Senior Director, CS, KNH  
The Chairperson, KNH- UoN ERC  
The Assistant Director, Health Information Dept, KNH  
The Dean, School of Medicine, UoN  
The Chair, Dept.of Paediatrics and Child Health, UoN  
Supervisors: Prof. Grace Irimu, Dept.of Paediatrics and Child Health, UoN  
Dr. Boniface Osano, Dept.of Paediatrics and Child Health, UoN  
Dr. Beatrice Mutai, Dept.of Paediatrics and Child Health, UoN

## APPENDIX 6: QUESTIONNAIRE

### HEALTH CARE WORKER QUESTIONNAIRE

Encircle one answer and specify where indicated.

1. Serial Number: \_\_\_\_\_  
Designation: \_\_\_\_\_  
Date: \_\_\_\_\_
2. Age: \_\_\_\_\_
3. Sex
  - a. Male
  - b. Female
4. Marital Status
  - a. Single
  - b. Married
  - c. Separated/divorced
  - d. Are you a parent?
5. What is your basic training level?
  - a. Clinical Officer
  - b. Medical Officer(MBCHB)
  - c. Enrolled Nurse(KEN/KECHN)
  - d. Registered Nurse(KRN/KRCHN)
  - e. Other(Specify): \_\_\_\_\_
6. Years worked after basic training: \_\_\_\_\_
7. Have you ever worked for a facility higher than a level three?
  - a. Yes
  - b. No
8. Number of CME's /Workshops attended on complementary feeding in the last one year;
  - a. No training
  - b. One training
  - c. 2 or more trainings
9. A child who has started on complementary feeds should breastfeed up to what age?
  - a. 6-11 months
  - b. 12 -18months
  - c. 18 -23 months
  - d. 24 months and beyond

10. For how long can breastmilk be stored at room temperature for a mother who decides to express her milk?
- less than 2 hours
  - 4 - 6 hours
  - over 6 hours
11. When should complementary feeding be introduced?
- less than 6 months
  - 6 – 7 months
  - After 7 months
12. What is the appropriate age for the introduction of water and other liquids in a breastfed child?
- less than 6 months
  - 6 – 11 months
  - Over 12 months
13. What is the appropriate age for the introduction of dairy products (milk, cheese and yoghurt)?
- Less than 6 months
  - 6 – 11 months
  - Over 12 months
14. When is the appropriate age to introduce eggs?
- Less than 6 months
  - 6 – 11 months
  - Over 12 months
15. When is the right time to introduce flesh food (chicken fish, beef)?
- Less than 6 months
  - 6 – 11 months
  - Over 12 months
16. What is the recommended daily frequency for complementary feeds for children who are breastfeeding at 6 – 8 months?
- 0 – 1 meal per day
  - 2 meals or more
  - Don't know
17. What is the recommended daily frequency for complementary feeds for children who are breastfeeding at 9 – 23 months?
- 0- 0 – 2 meals
  - 1- 3 or more
  - 2- Don't know
18. In non-breastfeeding children who are 6 – 23 months, what is the recommended daily frequency for complementary feeds?
- 0 – 3 meals per day

- b. 4 or more
- c. Don't know

19. What is the recommended frequency of feeding milk and milk products to non-breastfeeding children aged 6 – 23 months?

- a. Once-daily
- b. Twice or more
- c. Don't know

20. These are the 7 food groups recommended in complementary feeding for children aged 6 -23 months (dietary diversity)

- i. Grains, roots and tubers
- ii. Legumes and nuts
- iii. Dairy products (milk, cheeses and yoghurt)
- iv. Flesh foods (meat, fish, poultry and liver/organs)
- v. Eggs
- vi. Vitamin A-rich fruits and vegetables
- vii. Other fruits and vegetables

How many food groups should children aged 6 to 23 months consume daily?

- a. 2
- b. 3
- c. 4 or more

21. Which of the following are complementary feeding key messages?

Select one or more:

- a. Foods should always be thinned down with water to make them easier for a child to swallow
- b. Encourage the child to drink and eat during illness and provide extra food
- c. after illness to help the child recover quickly
- d. Breastfeeding for two years of age or longer helps a child to develop and grow strong and healthy
- e. Peas, beans, lentils, nuts and seeds are not suitable for children to swallow

22. Which of the following statements about complementary feeding are correct?

Select one or more:

- a. Complementary feeding is defined as giving other foods to replace breastfeeding
- b. Complementary foods need to have different ingredients to family foods
- c. Adding oils to foods is a good way of increasing the energy value of foods
- d. A growing child needs increasing amounts of food

23. Which of the following are good practices concerning hygiene and food preparation? Select one or more

- a. Using a cup with a lid
- b. Washing hands before breastfeeding
- c. Boiling fresh cow milk before giving it to the child
- d. Reheating cooked foods thoroughly

24. Tick in the appropriate box the types of complementary feeds

Food	Vitamin A	Iron rich food	Enhancer of Iron absorption	Inhibitor of Iron absorption
Liver				
Pumpkin				
Oranges				
Spinach				
Eggs				
Lemons				
Sweet potatoes				

**Attitudes on breastfeeding and complementary feeding**

SA=Strongly Agree, A= Agree, NS= Not Sure, D= Disagree, SD=Strongly Disagree

		SA	A	NS	D	SD
25	It is possible for babies to breastfeed on demand					
26	It is possible for working mothers to express breast milk at work					
27	It is possible for mothers to breastfeed their children for up to 2 years and beyond					
28	Although recommended it is not possible for mothers to wait up to 6 months to start complementary feeds					
29	It is not possible for boys to be satisfied by breastfeeding only; hence complementary feeds should be started earlier than 6 months					

In children above 6 months

		SA	A	NS	D	SD
30	It is possible for children to eat 4 out of the 7 food groups daily.					