MATERNAL KNOWLEDGE AND PRACTICE OF PORRIDGE PREPARATION AND STORAGE IN THE HOME

A research proposal in partial fulfillment for the degree of Masters of Medicine (Paediatrics and Child Health), University of Nairobi.

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DECLARATION

I declare that this is my original work. It is not published or submitted elsewhere for examination.

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II DEDICATION

I would like to dedicate this thesis to my parents Eng. J K Chege and Mrs. Consolata W Kiragu, my siblings Ms. Ruth Muithuiya Kiragu, Mr. Chege Kiragu and Beth W Chege and thank them for their unwavering love, support and encouragement. I also dedicate it to the children who have and will pass through my hands in the future and to the mothers who participated in the study.

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V LIST OF ABBREVIATIONS

FAO- Food and Agricultural Organization

FGD- Focus Group Discussion

GE- Gastroenteritis

HACCAP- Hazard Analysis Critical Control Point

KDHS- Kenya Demographic Health Survey

ORS – Oral Rehydration Solution

UNICEF- United Nations Children's Fund

USA- United States of America

WHO- World Health Organization

VI DEFINITIONS

Complementary feeds: Feeds introduced at six months of age to supplement breast feeding.

Diarrhea: Three or more loose stools in a day.

Food safety: Food safety entails all the conditions and measures that are necessary during the production, processing, storage, distribution and preparation of food to ensure that it is safe, sound, wholesome and fit for human consumption.

Food borne diseases: Diseases that are caused by the contamination of food by microbial pathogens or chemicals.

VII AKNOWLEDGEMENTS

I would like thank God for giving me the strength and the grace to achieve all that I have thus far, including this dissertation. I will be ever grateful to the members of my family for their unwavering support and love.

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I wish to thank Dr. Sule, Med Superintendent of Mbagathi District Hospital as well as the staff in the maternal child health clinic for their support during the data collection.

Special thanks to Ms Janet Muasya of the Department of Paediatrics for her help in the analysis of the data, I thank you from the bottom of my heart.

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VIII ABSTRACT

Background

Food safety entails all the conditions and measures that are necessary during the production, processing, storage, distribution and preparation of food to ensure that it is safe, sound, wholesome and fit for human consumption. *(1)* Food safety and hygiene becomes a major concern once complementary feeds are introduced to the infant. These feeds are more likely to be contaminated by various microbial agents due the process of preparation and storage as compared to breast milk. Studies done in developing countries have shown that food safety and hygiene practices are grossly inadequate. *(2,3)* Poor food safety and hygiene practices have been found to be one of the risk factors leading to the increase in the number of diarrheal episodes especially in the second half of infancy. *(4)* Improvement of food safety and hygiene in the home is important to the general health and wellbeing of our children and the family at large.

Objectives

The objective is to describe maternal knowledge and practice of porridge hygiene and storage in the home and the factors that are associated with the above.

Methods

This was a cross sectional survey conducted in the Mbagathi District Hospital, Nairobi. The tools used were questionnaires and focus group discussions. Mothers of children between the ages of 0 – 24 months who had initiated cereal based feeds were interviewed.

Results

The overall maternal score was 2. Mothers who scored zero in both questions regarding preparation and storage of porridge in the home were classified as having poor knowledge 71/397 (18%). Those who scored one point in both questions were classified as good knowledge 204/397 (51%) and those who scored one in either question as having some knowledge 121/397 (31%).

The maximum score for practice was 25 and the highest scored by the mothers was 24. The practice score was divided into 4 percentiles. Only 2/397 mothers scored below the 25th percentile (1%) and 112/397 (28%) below the 50$^{th.}$ Majority were in the 75th percentile 246/397 (62%) and 37/397 (9%) above the 75th percentile.

The factors significantly associated with knowledge were similar for practice and included the person responsible for preparation of porridge, maternal age, occupation, secondary school education, housing structure, access to toilet and water. Access to safe piped water and a water closet in the home were found to be the strongest predictors of both knowledge and practice.

Conclusions

1. Maternal knowledge is directly related to maternal practice of porridge preparation storage.
2. Half of the mothers had good knowledge of porridge preparation and storage and 71% were above the 50^{th} percentile for practice.
3. Young mothers who had low levels of education and income are more likely to have poor knowledge and practice.
4. Piped water in the house and the type of toilet were the most significant factors associated with both knowledge and practice.

Recommendations

1. Education of mothers in the antenatal, maternal and child health clinics and any other point of contact with mothers.
2. Encourage young girls to strive for excellence and obtain a minimum of secondary school education.
3. Encourage mothers to involve themselves in incoming generating activities in order to improve their income.
4. Improve access to piped safe water in the homes and encourage use of the water closet toilet for disposal of human waste.

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1 LITERATURE REVIEW

Food safety entails all conditions and measures necessary during the production, processing, storage, distribution and preparation of food. This ensures that food is safe, sound, wholesome and fit for human consumption. *(1)* It has increasingly become a public health concern due to its association with food borne diseases which are caused by the ingestion of food contaminated with microbial and chemical hazards and commonly presents as diarrheal illness. Food borne diseases are most commonly associated with microbial pathogens which may be bacterial, viral or parasitic. Examples of bacterial pathogens include Escherichia coli, Salmonella typhi, Campylobacter jejuni, and Vibrio cholera among others.

Food safety in regards to the child becomes a concern once feeds other than breast milk are introduced to the young infant. The current guidelines for infant and young child feeding advocate for exclusive breast feeding for the first 6 months of life at which point nutritionally appropriate complementary feeds are introduced in adequate quantities to support adequate growth and development. Breast feeding is encouraged until the child is 2 years old. *(5)* Breast milk is protective against infections as it contains various immunological factors that bind or destroy pathogens thereby preventing infection. It has the added benefit of being free, ready to use and therefore does not require any preparation or handling. This reduces its risk of contamination by microbial agents that occurs more commonly with complementary feeds.

The protective role of breast feeding is supported by many studies one of which was conducted in Brazil. This case control study showed that young infants who were not exclusively breast fed had a 25 fold greater risk of death from diarrhea compared to those who were exclusively breast fed. *(6)* A comparison of two studies in Kampala looked at the risks of serious gastroenteritis events in HIV exposed non infected infants in two different perinatal HIV prevention trials. One group ceased breast feeding at 4 months and the other at 9 months. The rates of serious GE events peaked earlier and were higher in the group that initiated complementary feeds at four months. *(6)* It is saddening that in Kenya only a third of infants are exclusively breast fed and one in three has received complementary feeds by 4 – 5 months thus putting these children at greater risk of diarrheal illness from contaminated food. The 2008 – 2009 Kenya Demographic Health Survey cited cereal based feeds as the most common complementary feed used in our setting, 72 % compared to mashed foods at 40%. *(8)* Ground cereals are used to make flour which is then mixed with water and cooked to make a semi solid meal which can then be enriched with sugar, milk or margarine. One in three mothers in Kenya introduces porridge as early as 2 – 3 months and by 6 -8 months 81 % of infants are feeding on this. *(8)*

Food borne diseases may present with fever, abdominal pain, nausea and vomiting but FAO reports that diarrheal illness is the most common manifestation. *(9)* WHO defines diarrhea as more than 3 loose stools in a day. *(10)* Various factors play a role in diarrheal illness. Examples of risk factors include extremes of age which have a bearing on the integrity of the immune system, immunosuppression, diseases like measles, malnutrition and lack of exclusive or predominant breast feeding as discussed above.*(11)* Diarrheal illness is a major cause of morbidity and mortality especially in children. The Kenya Demographic Study of 2008 – 2009 found that 17% of children under the age of five years had experienced diarrhea in the two weeks prior to the study *(12)* Many studies have shown that it is more common during the period of complementary feeding. Snyder et al reported about 3 – 6 episodes during the period of 6 – 11 months compared to approximately 2 episodes in the first half of infancy in the period between 1954 and 1981. *(13)* Kosek et al reported rates of 4.8/ child / per year during the same period.*(14)* The KDHS of 2008 – 2009 showed that diarrhea in our children also peaked during 6 – 11 months and accounted for a third of all diarrhea in children under five years. *(12)* As the infant develops and learns to put things in their mouths and crawl about they come into contact with multiple sources of pathogens that may also contribute to diarrhea in this age group. *(15)*

While the factors contributing to diarrhea are multiple, contamination of complementary feeds has been found to play a major role in the causation of diarrhea and associated malnutrition. These two diseases combine to form a vicious cycle that leads to a general decline in health status that can culminate in death. *(4)* In an effort to decrease contamination of complementary feeds in the home, the World Health Organization in 1996 introduced the Basic Principles for Preparation of Safe Foods for Infants and Young Children. These general principles can be applied to almost all foods for the young infant and child *(16)*

These include:

1. Cooking all food thoroughly.
2. Avoid storage of cooked food.
3. Avoid contact between raw foodstuffs and cooked food.
4. Wash fruits and vegetables.
5. Use of safe water.
6. Wash hands repeatedly.
7. Avoid bottle feeding.
8. Protect food from insects, rodents and other animals.

9. Store non perishables in a safe place.
10. Keep all food preparation surfaces very clean.

Cooking of food to a minimum temperature of 70º C ensures that most contaminants of food are killed. It is recommended that food for infants should be freshly prepared and used immediately once cool enough to eat. If it is not possible to prepare each meal freshly it is further recommended that it should only be stored for the next meal at below 10º C, reheated to minimum of 70º C and cooled before consumption. Implementation of rule number three ensures that cooked food is not directly contaminated by raw food. Indirect contamination can also occur via hands, flies, utensils, surfaces and the addition of contaminated ingredients. Washing of fruits and vegetables decreases contamination on the surface of the food. If possible WHO recommends that fruits and vegetables used for complementary feeds should be served peeled and in the areas where heavy contamination is likely e.g due to the use of untreated waste water for irrigation these foods should be served cooked.

Good personal hygiene practices such as washing of hands thoroughly and repeatedly before preparation and after interruptions in the food preparation process decreases chances of contaminating food. Washing of hands after visiting the toilet or handling fecal matter to prevent contamination with fecal oral pathogens is extremely important. Cups and spoons are preferred for feeding young children because they are easier to clean as compared to bottles and teats and should be cleaned immediately after use. It is essential that chemicals should be kept in closed and labeled containers away from food as contamination with these can result in poisoning with disastrous effects. Scraps of food and crumbs are potential reservoirs of pathogens and attract insects and animals therefore all cooking surfaces must be kept clean and all refuse covered and disposed of quickly.

The above guidelines at a single glance appear simple enough but may be difficult to implement in developing countries. These countries differ greatly from those in developed ones. They are experiencing a rapid expansion of urbanization leading to an increased dependence on stored foods against a background of poverty, poor access to safe water, electricity, poor sanitation and lack of safe food preparation facilities. *(9)* Poverty may lead to lack of fuel to adequately cook complementary feeds freshly for each meal or allow for reheating. Poor access to safe water may lead to use of contaminated water for preparation of feeds or be so insufficient as to hinder hand washing and washing of utensils used for cooking food and for feeding the child. The lack of electricity for proper storage of food at the temperatures mentioned above leads to

storage of feeds at ambient temperatures which allows for bacterial proliferation which may result in diarrheal illness. Other contributory factors are ignorance, sociocultural beliefs and shortage of time as more of our mothers are involved in income earning activities. *(2)* Traditional methods of food storage are more applicable in our setting as they do not really on electricity. Examples include smoking of meat and fish, drying of meat, fish and cereals, fermentation of milk and porridge and curing of meat with salt. These methods are not suitable for infant and young child feeding.

Data from developing countries shows that a substantial proportion of food borne diseases are due to unhygienic food practices in the home. Seventy percent of diarrheal episodes in developing countries have been traced to contamination of complementary foods. *(3)* Poor personal and community hygiene have also been associated with increase in infections. This was the conclusion of a Medline metanalysis conducted in the period between January 1980 & June 2001. The analysis included studies with an outcome of infection or symptoms of infection with an independent variable of one or more hygiene measures. The result was a relative reduction of 20 % or more in the risk of illness when a hygiene measure(s) was/ were applied. *(17)* Proper hand washing can decrease food contamination. An American study showed that 73% of mothers of young infants did not always wash their hands before preparation of formula. *(18)* Closer to home, 60 % of mothers in a Limpopo study did not wash their hands after visiting the toilet despite almost all having knowledge of the transmission of diarrhea. The reported prevalence of diarrhea during the six months of study was found to be 68%. *(3)*

A Hazard Analysis Critical Control Point study conducted by Sheth et al showed that complementary foods were heavily contaminated in homes where poor personal and environmental hygiene was practiced. Unhygienic preparation of complementary feeds has been found to lead to contamination with enteric pathogens which are major sources of diarrheal disease. *(19)* Escherichia coli was found to be the most common culprit in microbiological studies of complementary feeds in different countries. It was isolated in 70% of cultures in Limpopo, South Africa, 43 % in Egypt, 41 % of cultures in Bangladeshi and 16 % in Zimbabwe. (*3, 20, 21, 22)* Contamination of feeds does not only occur among the poor as demonstrated by Kaul & Kaur who conducted a study in middle and high income households in India. E.coli was identified in 61 % and 43 % of complementary feeds respectively. *(23)* Other common pathogens isolated in other studies include Bacillus cereus, Staphylococcus aureus, Vibrio cholera, Campylobacter jejuni, Salmonella, Shigella and Rota virus. The most common

parasite identified was Entamoeba histolytica. Others include Giardia, Cryptosporidium and Ascariasis. *(19)*

A study in Nigeria identified critical control points in complementary food handling. It concluded that while most methods of cooking attained cooking temperatures capable of killing most vegetative forms of food borne pathogens, contamination of food was increased by storage at ambient temperature, use of insufficient temperature to reheat food, addition of ingredients when no further heat was applied and the purchase of contaminated food & ingredients in open air markets. *(24)* Sheth et al identified other hazards including the use of left over feeds, failure to wash hands prior to cooking, consumption of food spilled on the floor, use of dirty cloth to wipe hands and utensils and use of unsterilized and dirty feeding bottles. *(19)* Another study in Hanoi Vietnam found that mothers did not separate raw form cooked foods and prepared food on the ground. *(25)*

Bacteria were quantified in two types of porridge used for infant feeding and water in 54 households in Tanzania. One type of porridge was an instant preparation and the other was cooked. The cooked porridge had less contamination at preparation and after 4 hours of storage when compared to the instant preparation and the study concluded that cooking porridge was safer. Some forms of bacteria were higher in the porridge when compared to water showing that porridge is a good culture medium for bacterial growth and the risk of this increases when left in ambient temperature for long durations. *(3)*

2 STUDY JUSTIFICATION & UTILITY

Proper food safety and hygiene measures in the home have a role in promoting the general health of our children. While diarrheal episodes in the last half of infancy and the young child may be associated with various factors, contamination of complementary feeds plays a major role. *(3)* The data obtained from the few studies done in developing countries call their food safety and hygiene practices in the home to question. *(2, 3, 24)* This study sought to document the degree of unhygienic knowledge practices in regard to complementary feeding in the home and to describe the factors contributing to the above. The results of this study has provided local data that can assist health care workers to promote the health of infants and young children by improving preparation and storage of their complementary feeds.

3 STUDY OBJECTIVES

3.1 Primary objective

1. To describe maternal knowledge and practice of porridge preparation and storage in the home.

3.2 Secondary objective

1. To describe the factors associated with maternal knowledge and practice of porridge preparation and storage in the home.

4 METHODOLOGY

4.1 Study design

The study was divided into two parts.

- A descriptive cross sectional study in which semi structured questionnaires were filled during face to face interviews. This provided both qualitative and quantitative data.
- Focus group discussions which provided qualitative data.

4.2 Site

The study was conducted in the Maternal Child Health clinic at Mbagathi District hospital.

4.3 Inclusion criteria

1. Mothers of children aged 0 to 24 months who had already initiated cereal based complimentary feeds.
2. Mothers who gave consent.

4.4 Exclusion criteria

1. All mothers who declined to give consent.

4.5 Size

The sample size was calculated using the Fisher's formula. The prevalence was assumed to be 50 %.

$$n = \frac{z^2 \times P(1-P)}{m^2}$$

n = sample size

z = confidence level 1.96

m = level of precision around the mean 5%

p = 50 %

Sample size of 384

4.6 Patient Recruitment.

Mothers were approached in the MCH clinic and after introducing ourselves, we ascertained if they met the inclusion criteria. We explained the purpose and the method of the study and availed a predesigned consent form in both Kiswahili and English and allowed the participant to choose the language they were more comfortable in. The form described the purpose and the procedure of the study as well as the risks of participation. Written voluntary and informed consent for participation was then obtained from the participant and the form countersigned by the investigator. A copy of the form was availed to the mother. Data was then collected from the participants by administration of the semi structured questionnaire during a face to face interview or during the focus group discussions.

5 DATA COLLECTION

I was the principal investigator with two registered clinical officers as my research assistants who I trained on data collection. Tools used included a semi structured questionnaire and focus group discussions. The questionnaire was translated into Kiswahili and pretested on eligible mothers and corrected. Results of the pretest were not included in the study.

5.1 The Questionnaire

Questions were divided into four modules. These were:

1. Socio demographic characteristics: the age, marital status and educational level of mother, age and sex of index child, family residence.
2. Socio economic characteristics: household type, access to clean water, access to sanitation and type of fuel used.
3. Personal and environmental hygiene methods: hand washing practices, methods of human and other waste disposal.
4. Food handling practices: purchasing points of ingredients, methods of preparation and storage, reheating techniques and duration of storage.

5.2 Focus Group Discussions

I conducted two FGDs with the help of my research assistants. The groups consisted of 8 mothers who fulfilled the inclusion criteria. One group consisted of first time mothers and the second of mothers with more than one child. The mothers were approached in the same manner as the interviews and their eligibility ascertained. Those who meet the eligibility criteria but had participated in the face to face interviews were excluded. We sensitized the mothers that they would be participating in a discussion that would be recorded and that their permission to record the discussion would be required prior to their participation. Written informed consent was then obtained voluntarily and counter signed by myself. Mothers were asked to freely list:

1. Ten types of complementary foods they give their children.
2. How they store the porridge.
3. The problems faced during preparation of porridge.
4. How they deal with the above problems.

Their socio -demographic characteristics were recorded .Once the group was assembled I gave a preamble of the topic and the discussion then followed a prepared focus group discussion guideline to assess the mother's knowledge and practice of food safety practices in the home. The discussions lasted one hour each and were recorded by the assistants who also took down written summaries.

6 DATA MANAGEMENT AND ANALYSIS

6.1 The Questionnaire

Data was coded, cleaned, verified and analyzed using SPSS (Statistical Package for Social Sciences) computer version 17 software and Microsoft Excel 2007.

The questions from the questionnaire were scored separately for knowledge and practice and the total score of the participants were given as a proportion out of the total for that category. Categorical data assessed included participant's age, marital status, level of education and occupation and this was tabulated. Mean, median and standard deviation was used to summarize the age of the participants. Statistical testing was done using Chi square test for categorical variables. Tests of associations were performed using Chi-square test for categorical variables. The total knowledge and practice scores were combined to make a total hygiene score. Logistic regression with inclusion of variables found to be significant was carried out on the hygiene score to determine independent determinants of poor food safety practices. Data was presented using pie charts, histograms and tables.

6.2 The Focus Group Discussions

The first responses from the free listing were analyzed and proportions calculated from the data presented by a pie chart. A summary of the two discussions was submitted as part of the results.

7 ETHICAL CONSIDERATIONS

The purpose of the study was explained in a language easily understood by the mother who was assumed to be legally competent based on her status of motherhood. The potential risks of the study were discussed and the mother assured that she was allowed to withdraw from the study at any time without penalty. Verbal and written informed consent was then sought from the participant. Each participant was interviewed separately and no names were included in the results to ensure confidentiality.

Ethical approval was sought and obtained from the Department of Paediatrics and the Ethical Board of KNH. Feedback was given to the Department of Paediatrics in form of a poster and the final thesis report. The staff in the MCH was given an outline of the results in form of Continuous Medical Education so that they are aware of points to address to the mothers during teaching on complementary feeding. This ensured dissemination of results.

8 STUDY LIMITATIONS

The study relied on self reported data of knowledge and practice with no accompanying measures of accuracy and depended on the willingness of the participant.

9 RESULTS

9.1 The Questionnaires

Table 1: Description of Mothers

CHARACTERISTICS	N = 397	PERCENTAGE
Married	353	88.9
Single	42	10.6
Divorced	1	0.25
Missing	1	0.25
Education		
None	17	4.3
Complete primary	374	94.2
Incomplete primary	4	1.0
Complete secondary	277	69.8
Incomplete secondary	101	25.2
Tertiary	136	34.2
Occupation		
None	163	41.0
Skilled	61	15.4
Unskilled	162	40.8
Missing	11	2.8
Number of children		
One child	187	47
More than one	210	53
Person responsible for most of meals		
Mother	307	77.9
Other	87	22.1
Number of rooms in the house excluding toilets		
1	83	23.3
2	111	31.2
3	97	27.2
4	56	15.7
5 or more	9	2.5
Type of floor		
Earthen	25	6.3
Wooden	9	2.3
Cement	283	71.3
Tiled	80	20.2
Type of walls		
Stone	290	73.0
Wooden	16	4.0
Iron	69	17.4
Earthen	22	5.5
Access to toilet		
No	5	1.3
Own toilet	172	43.3
Shared free	193	48.6
Shared at a cost	27	6.8

Access to safe water		
Piped water in the house	212	53.4
Community tap	105	26.5
Well/ borehole	80	20.1
Source of fuel for cooking		
Gas	215	54.1
Electricity	121	30.5
Kerosene	113	28.5
Charcoal	90	22.7
Other	11	2.8

A total of 397 mothers were recruited for the questionnaire and 2 groups of 8 women each for the FGDs. The mean age of in the questionnaire was 26.4 years with a range of 19-37 (S.D of 3.5). Almost all mothers were married 353/397 (88.9%). Only 17/397 (4.3%) had no formal education and majority 374/397 (94.2%) had completed primary school education. Unemployed mothers were 163/397 (41%) while skilled workers were 61/397 (15.4%) and unskilled 158/397 (39.8%). First time mothers were almost equal to mothers with more than one child 187/ 397 (47%) and 210/397 (53%) respectively.

Only 83, (23.3%) of mothers lived in a one roomed house. The most common materials used to build the houses were cement floors 283/397 (71.3%) and stone walls 290/397 (73%). Only 5/397 (1.3%) had no access to a toilet and 27/397 (6.8%) had to pay for the use of a toilet. More than half had piped water in the house 212/397 (53.4%). The most commonly used fuels used for cooking were gas 215 (54.1%), electricity 121 (30.5%) and kerosene 113 (28.5%).

Table 2: Maternal knowledge

Question	N=397	Percentage
Q 22. When is it important to wash your hands		
After visiting the toilet	384	96.7%
Before preparing food	298	75.0%
Before eating	345	86.9%
Before feeding the baby	340	85.6%
After eating	31	7.8%
Q 25. How often are you supposed to cook porridge for the child?		
For every feed	259	65.2%

Figure 1: Graphical Representation of Maternal Knowledge

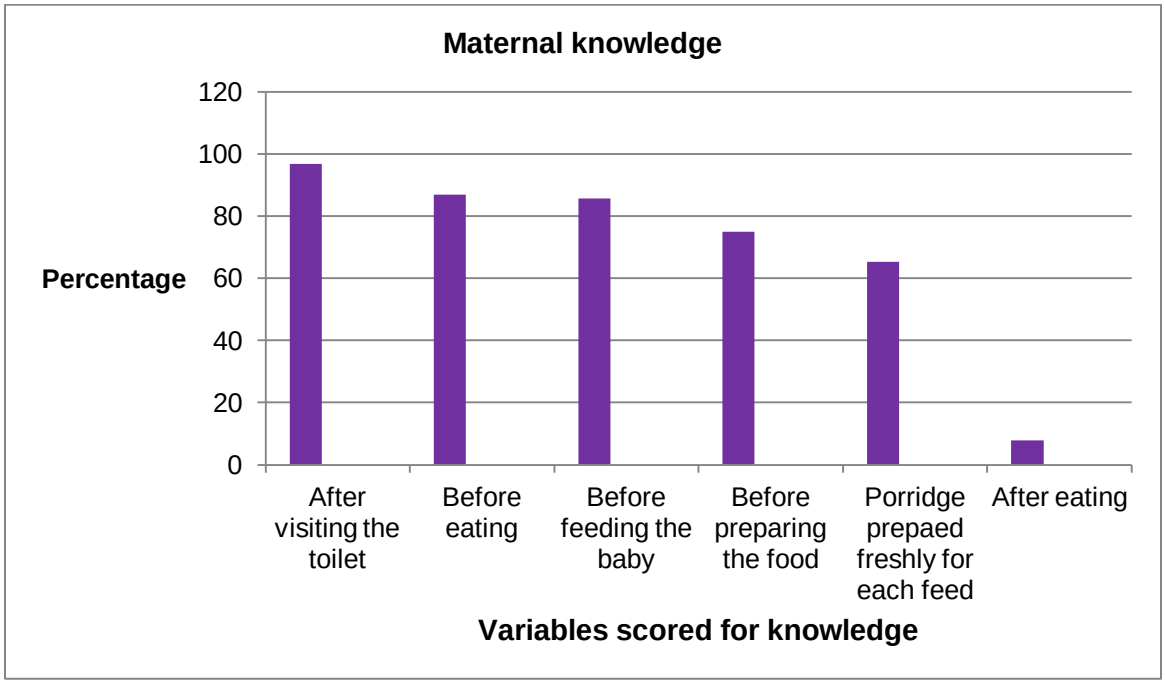
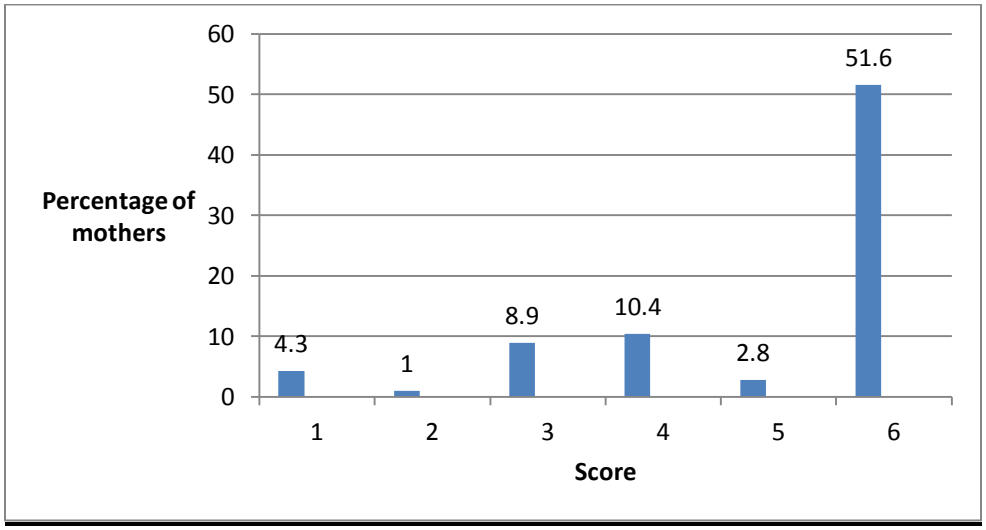
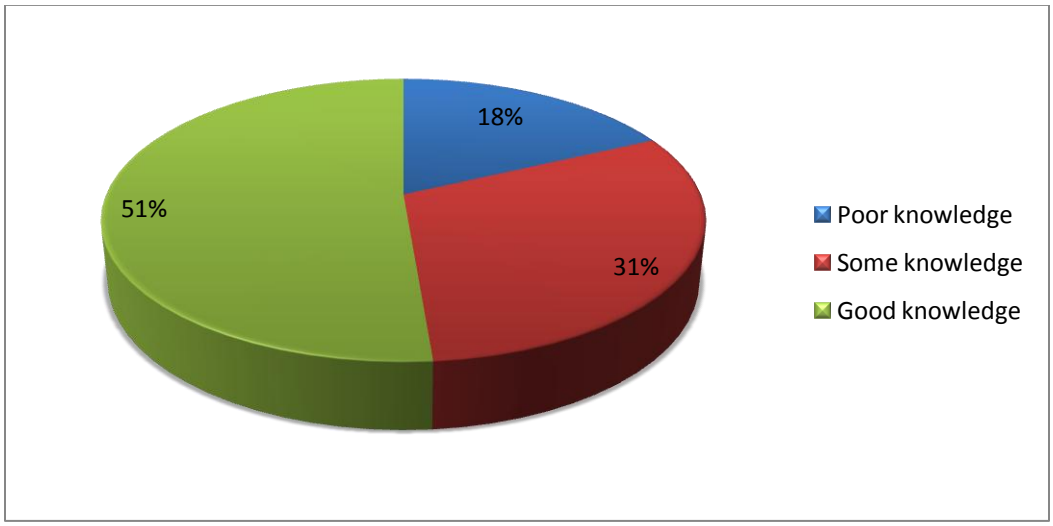


Figure 2: Distribution of Total Knowledge Score



Score was one mark for correct response with a maximum of 6 marks for knowledge. The mothers were further grouped according to the two questions asked. If a mother gave all answers for hand washing she scored one and zero if she gave less than five answers. If she gave the correct answer for frequency of preparation of feeds she scored one mark. The total mark was 2 for good knowledge. Those who obtained a total of one had some knowledge and those who scored zero were marked as poor knowledge.

Figure 3: Total Score for Maternal Knowledge



Approximately half of the mothers had good knowledge of both hand washing and the frequency of preparing porridge for the baby 204/396 (51%). A third had some knowledge 121/396 (31%) and 71/ 396 (18%) had no knowledge of either.

Table 3: Factors Associated with Maternal Knowledge

	F	**%**	**Valid percent**	
0	71	17.9	17.9	
1	121	30.5	30.6	
2	204	51.5	51.1	
Total	396	99.7	100	
missing	1	.3		
total	397	100		
Person responsible for meals in the home – p value 0.000				
	Other	Mother	OR	Chi sq for Trends
0	6 (8.6%)	64 (20.8%)	1	22.93
1	15 (12.5%)	105 (34.4%)	1.524	
2	66 (32.5%)	137 (44.8%)	5.139	
total	87	307		
Maternal age – p value 0.000				
	≤ 25 yr	>25 yr	OR	Chi sq for Trends
0	44- (27.3%)	27- (11.6%)	1	22.07
1	54- (33.5%)	67 (28.8%)	0.495	
2	63- (39.1%)	139 (59.7%)	0.278	
total	161	233		
Secondary school education – p value 0.002				
	Incomplete	Complete	OR	Chi sq for Trends
0	6- (15.8%)	32-(84.2%)	1	1.17
1	9- (10.5%)	77-(89.5%)	0.623	
2	7- (4.0%)	167- (96%)	0.557	
total	22- 7.4%	276-92.6%		
Occupation – p value 0.000				
	Unskilled	Housewife	Skilled	
0	23 (14.3)	41 (59.4%)	5 (7.2%)	
1	50 (31.3%)	57 (47.5%)	13 (10.8%)	
2	54.6 (54.6%)	65 (33.2%)	43 (21.9%)	
total	160	163	61	
Number of rooms excluding toilet- p value 0.000				
	1	>1	OR	Chi Sq for Trends
0	29(40%)	37 (13.6%)	1	18
1	23 (27.7%)	79 (29%)	0.371	
2	31 (37.3%)	156 (57.3%)	0.254	
total	83	272		
Type of floor –p value 0.000				
	Earthen	Other	OR	Chi Sq for Trends
0	13-18.3%	58 (15.3%)	1	20
1	7-5.8%	124 (32.5%)	0.25	
2	5-2.5%	199 (52.2%)	0.112	
total	25	381		
Type of wall – 0.000				
	Earthen	Other	OR	Chi Sq for Trends
0	12 (54.5%)	59 (15.8%)	1	20.8

1	6 (27.2%)	115 (30.7%)	0.257	
2	4 (18.1%)	200 (53.5%)	0.098	
total	289	107		
Access to toilet – p value 0.000				
Score	No	Yes	OR	Chi Sq for Trends
0	4-(80%)	67-(17.1%)	1	20.65
1	1-(20%)	120-(30.7%)	5.695	
2	0	204- (52.2%)	16.5	
Total	5	391		
Type of toilet – p value 0.000				
Score	WC	Pit latrine	OR	Chi Sq for Trends
0	22 (9.2%)	44(29.1%)	1	59
1	65 (27.2%)	55 (36.5%)	2.327	
2	152 (63.6%)	52 (34.4%)	5.846	
Total	239	151		
Water source – p value 0.000				
	Piped water in house	Community tap	Borehole/ well	Other
0	15 (7.1%)	39- (37.1%)	4 (100%)	13- (16.9%)
1	50 (23.8%	32- (30.4%)	0	39- (50.6%)
2	145 (69%)	34-(32.5%)	0	25- (32.5%)
total	210	105	4	77

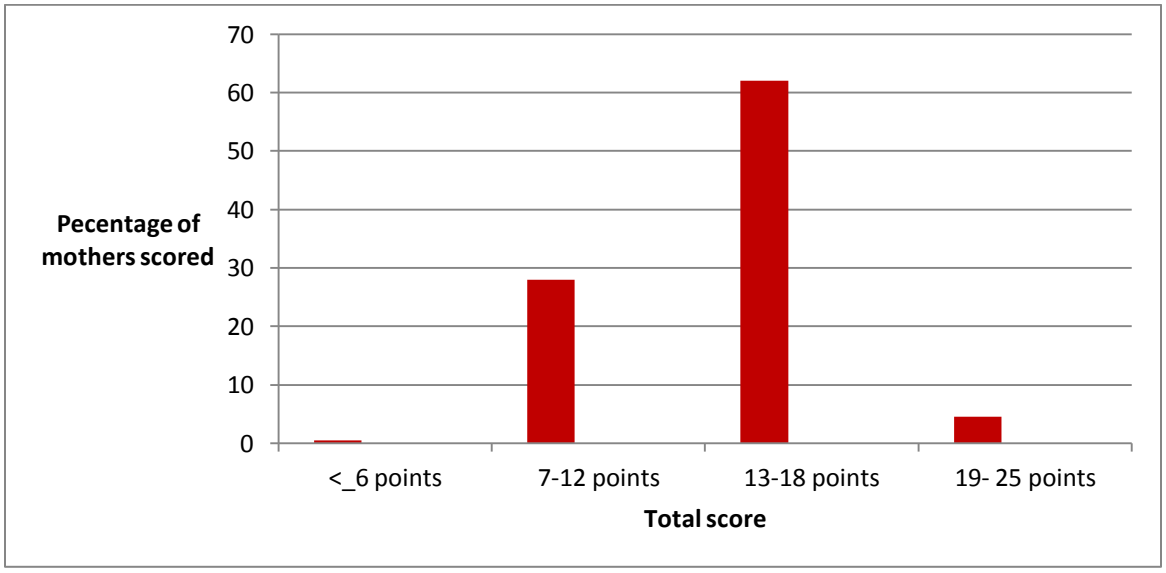
Table 4: Maternal Practice

Question	N= 397	Percentage
Q 17. Are animals allowed to roam in the compound		
No	1	0.25
Q 18. Are animals allowed to roam in the house		
No	2	0.5
Q 19. What do you use daily to collect the child's waste		
Nappies	189	47.6
Disposable diapers	141	35.5
Pieces of cloth	23	5.8
Q 20. How do you dispose of the child's waste		
Water closet	176	44.3
Pit latrine	140	35.3
Dustbin	39	9.8
Q 21. How do you dispose of other household wastes		
Garbage collectors	274	69
Community dump	108	27.2
Q 23. When do you wash your hands		
After visiting the toilet	386	97.2
Before preparing food	296	75.1
Before eating	308	77.6
Before feeding baby	305	76.8
After eating	31	7.8
Q 24. Where do you prepare the food		
On a counter	269	67.8
Q 26. How often do you cook porridge for the child		
For every feed	256	64.5
Q 28. What kind of flour do you use to cook the porridge		
One flour	355	89.4
Q If more than one flour is used do you		
Buy it mixed	13	3.3
Q 30. Where do you buy the flour from		
Supermarket	241	60.7
Q 33. At what point during the cooking is the porridge enriched		
When starting to cook	19	4.8
Q 34. How do you determine that the porridge is fully cooked		
Comes to a boil	283	71.3
Q 35. How soon after it is ready is the child fed		
Immediately	257	64.7
Within 4-6 hours	140	35.3
Q 36. What is the left over porridge stored in		
Flask	274	69
Container with a cover other than a flask	96	24.2
Q 37. Where is the left over porridge stored		
In the fridge	39	9.8
Cupboard	316	79.6
Q 38. Is the left over porridge reheated before the child is fed		

Yes	221	55.7
Q 39. How long do you reheat the porridge		
Until it boils	51	12.8
Q 40. How do you check the temperature of porridge before feeding the baby		
Taste with a spoon	185	46.6
Q 41. Do you use separate utensils for the child		
Yes	225	56.8
Q 42. Do you wash the child's utensils separately		
Yes	218	54.9
Q 43.How do you dry the dishes		
Open air	108	27.2
Q 44. Where do you place the dishes to dry		
On a rack	137	34.5
On a table or stool	93	23.4
Q 45. How often do you wash the cloth for drying dishes with soap and hung to dry		
After every use	96	24.2

The total score for knowledge was 30. In the final analysis mothers who gave all the answers for question 23 were awarded one score as was done for the knowledge. The final score was 26 and this was divided into four percentiles the results of which are shown in the graph below.

Figure 4: Overall Maternal Practice



Less than 1 %, 2/397 scored below the 25th percentile. 112/ 397 (28%) were in the 50th percentile for practice. Most mothers were found in the 75th percentile 246/397 (62%) and 37/397 (9.3%) had good practice.

Maternal knowledge was found to be significantly related to practice (p value 0.000)

Table 5: Factors Associated With Maternal Practice

	f	%	VALID %	
< 6	2	0.5	0.5	
7- 12	112	28.2	28.2	
13-18	246	62	62	
19- 25	397	9.3	9.3	
Maternal age - p value 0.000				
	≤25	>25	OR	Chi Sq for Trends
< 6	1 (0.8%)	1 (0.4%)	1	41.69
7- 12	41 (31.1%)	41 (17.6%)	1	
13-18	83 (62.8%)	161(69.1%)	0.516	
19- 25	7 (5.3%)	30 (12.9%)	0.233	
Total	132	233		
Maternal Occupation – p value 0.000				
	Informal	Housewife	Formal	
<6	1(0.6%)	1- (5%)	0	
7-12	41 (25.3%)	67- (41%)	2-(3.3%)	
13-18	104 (64.2%)	88- (54%)	49-(80.3%)	
19-25	16 (9.9%)	7- (4%)	10-(16.4%)	
total	162	163	61	
Person responsible for meals – 0.000				
	Other	Parent	OR	Chi Sq for Trends
< 6	0	2 - 0.7%	N/a	28.04
7- 12	2- (2.3%)	109-(35.5%)		
13-18	74- (85.1%)	171-(55.7%)		
19- 25	11- (12.6%)	25 – (8.1%)		
total	87	307		
Secondary school education – 0.000				
	Incomplete	Complete	OR	Chi Sq for Trends
< 6	0	0		
7- 12	16 - (32.7%)	33 (20%)	1	41.69
13-18	6- (2.8%)	207 (74.7%)	0.60	
19- 25	0	37 (13.3%)	0.00	
total	22	277		
Type of floor- p value 0.000				
	Earthen	Other	OR	Chi Sq for Trends
< 6	1 (0.04%)	1 (0.3%)	1	38.9687
7- 12	20 (80%)	92 (27.5%)	0.217	
13-18	4 (16%)	242 (72.2%)	0.017	
19- 25	0	0		
total	25	335		
Type of wall – p value 0.000				
	Earthen	Other	OR	Chi Sq for Trends
< 6	1 (4.5%)	1 (0.3%)	1.0	30.844
7- 12	17 (77.3%)	95 (25.3%)	0.179	

13-18	4 (18.1%)	242 (64.4%)	0.017	
19- 25	0	37(10%)	0.000	
total	22	375		
Access to toilet – p value 0.000				
	No	Yes	OR	Chi Sq for Trends
< 6	0	2 - (5.1%)	N/a	11.522
7- 12	5 (100%)	107 - (27.3%)		
13-18	0	246 - (62.6%)		
19- 25	0	37- (9.4%)		
total	5	392		
Type of toilet -0.000				
	WC	Pit latrine	OR	Chi Sq for Trends
< 6	0	2 - (1.3%)	N/a	67
7- 12	18 (7.5%)	89 - (58.6%)		
13-18	184 (77%)	61- (40.1%)		
19- 25	37 (15.5%)	0		
total	239	97		

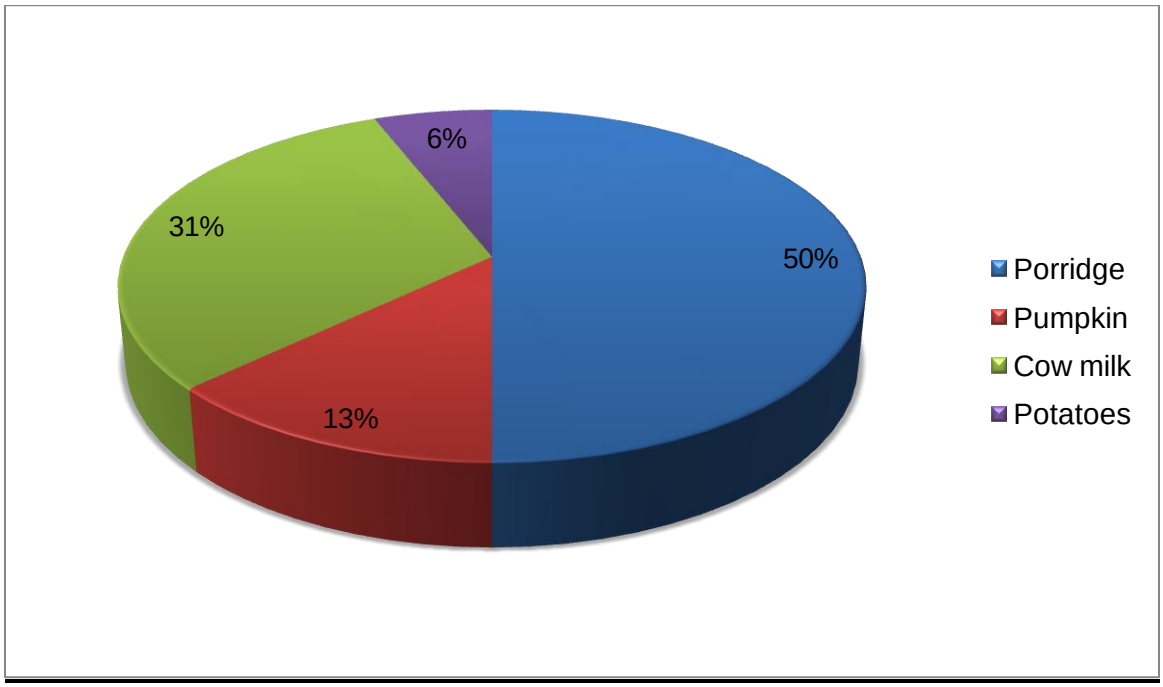
Primary and tertiary education, parity, marital status and the number of people living in the house were not found to be significantly related to either knowledge or practice. A total hygiene score was calculated by adding up the practice and knowledge scores which was then subjected to logistic regression. The only two significant associated variables were the type of toilet and water source.

Table 6: Logistical Regression

Constant variables	Significance
Marital status	0.890
Person responsible for meals	0.344
Number of rooms in house excluding toilet	0.188
Type of floor	0.686
Type of toilet	**0.001**
Age in years	0.402
Occupation	0.630
Piped water in the house	**0.006**
Community tap	0.11
Years of education	0.265
Dependent variable – hygiene score	

9.2 Summary of the Focus Group Discussions

Figure 5: Most Common Complementary Food Used by Mothers in the FGDs



Porridge was the most common complementary food listed by the half of the eighteen mothers in the focus discussion groups. Cow milk was the most common for 5/16 (31%), pumpkin for 2/16 (13%) and potatoes for 1/16 (6%).

Most mothers stored porridge in flask/ thermos 11/16 (69%) for the reason that it kept the porridge warm and therefore did not require heating. The rest used a jug with a cover. Most of the porridge was stored at room temperature as only1 of the mothers owned a fridge and she did not use it to store complementary feeds. The precautions taken when storing the porridge included allowing it to cool before covering it especially when storing in a jug, covering the porridge to prevent contamination and storing it in the coolest place in the house. The average duration of cooking was 10 – 15 minutes regardless of the type of flour used. Wheat and maize flour were the most commonly used. Porridge was enriched using margarine, sugar, milk and egg. These were added at the beginning or the end of the cooking process or when serving. The porridge was said to be ready when the froth had boiled away, it had a certain smell or had a thick layer at the bottom of the sufuria after cooking. A mwiko was used to confirm it was ready in most instances. It was dipped in the porridge and a small amount placed on the palm of the hand for tasting. The infant and young child had their own utensils which were washed separately.

Most mothers knew that the porridge should be prepared at least twice per day in keeping with the 2 porridge feeds for the day. In actual practice most prepared the feeds once per day. In most instances the porridge was not reheated because the flask was thought to have maintained the temperature sufficiently, those that reheated it warmed it just warm enough for the baby. The major problems noted were food spoilage and the high cost of fuel and lack of time to prepare each meal freshly for the baby. Food spoilage was solved by some by making each meal freshly, avoiding adding milk during the cooking process and adding it during the actual feed and storing the cool porridge in a covered jug and placing this in a bucket of cold water.

Spoilage of the porridge was a major concern for all the mothers as the porridge cooked in the morning was unable to keep until the evening without spoiling. To combat this some opted to use the jug as they found that allowing the porridge to cool before covering it, others opted to forgo enriching with milk during preparation. Washing the jug and flask thoroughly with warm water was thought to help as well as storing hot water in the flask for ten minutes before storing the porridge in it. Only one of the 16 mothers owned a fridge but still opted to use a jug.

10 DISCUSSION

Half of the mothers in the questionnaire had good knowledge and 283/397 (71%) were over the 50th percentile for practice of porridge preparation and storage in the home. Overall maternal knowledge was found to be significantly associated with overall practice in that higher level of knowledge was associated with better practice. The highest individual scores in both knowledge and practice were hand washing after visiting the toilet 384/397 (96.7%) and 386/397 (97%) respectively. This is important as it decreases contamination by fecal organisms which may lead to diarrheal illness and is recommended by the WHO in the Basic principles for preparation of safe food for the infant and young child as a method to combat food contamination *(16)*.The scores for knowledge of hand washing before eating or feeding the baby 345/397 (86.9%) and 340/397 (85.6%) respectively were higher than that of before preparation of food 28/397 (75%). The scores for practice were lower for all three. Poor hand washing before preparation of food was identified as a risk factor for food contamination in an Indian study while a hazard and critical control study in Nigeria found that the temperatures attained during preparation of complementary food were sufficient to kill most pathogenic organisms *(19, 24)*. The recommended temperature by WHO is 70 ^{0}C *(13).*

Enrichment of porridge was practiced by 229/397 (57.7%) but only 19/397 (4.8%) did so at the beginning of the cooking process. The addition of other ingredients after the food has already cooked has found to be another critical control point in the food preparation process *(24)*. Confirmation that the porridge was the right temperature for the baby was done using a spoon for tasting by 185/397 (46.6%) while 10/397 (2.6%) dipped their finger in the porridge.

Two in three of mothers were aware that porridge for the baby should be made freshly for each meal and actually put this into practice. This was found to be difficult for most mothers in the FGD due to lack of time even for the unemployed mother who had a lot of chores around the house. The high cost of fuel was found to be a major hindrance especially as the cost had gone up during the study period. Only 39/397 (9.8%) of the study population in the questionnaire and a 1/16 (6%) in the FGD had a refrigerator for storage of left over feeds and the practice was to store the porridge in a flask or jug at room temperature. Storage of feeds at these temperatures leads to multiplication of pathogenic organisms and was found to be a critical control point in the study mentioned above and was a similar finding by Sheth et al in India *(24, 19).* Half of mothers 221/397 reheated the porridge before feeding the baby and only 51/397 (12.8%) reheated it to temperatures required to kill pathogenic organisms. The mothers in the FGD thought that it was unnecessary to reheat the porridge as the flask kept it warm enough for the baby and for this

reason the flask was found to be a popular storage option 274/397 (69%). Two hundred and twenty five mothers (46.6%) used separate utensils for the baby and 218/397 (56.8%) washed them separately as recommended in the Basic principles for preparation of safe food for the infant and young child but only 108/397(27.2%) allowed the dishes to dry in open air. The use of a wash cloth is likely to contaminate already clean utensils especially if it is not washed after every use as was the practice of only 96/397 (24.2 %) of the mothers.

Both knowledge and practice were better when someone other than the mother prepared the porridge for the baby. Three out of four times the mothers were found to be responsible for the preparation and when this was analyzed further it was found that they were younger, uneducated and tended to be unemployed. Secondary school education was found to significantly improve both maternal knowledge and practice. The mother with better education was more likely to be employed and this had an impact on her socioeconomic status. This mother is more likely to afford fuel for preparing food freshly for the baby or for reheating it to optimum temperatures. The socioeconomic status was described using the number of rooms and the type of material used to make the walls and the floor, access to water and toilet. A poor socioeconomic status was described as a single roomed house made of earthen floor and walls, no access to a toilet or running water in the in the house. Poor socioeconomic status was associated with poor knowledge and practice.

The only two significant variables found to be significantly associated with the total hygiene score when subjected to logistic regression were the type of toilet and access to water in the house. Having access to water in the home makes it easier to wash hands, dishes and flush the toilet and generally improve hygiene. A mother who has to buy water or obtain it for free but from a distance is more likely to be very careful with the way the water is used and this may negatively impact on the level of hygiene. Mothers who had access to a water closet toilet are also most likely to have piped water in the house and this may be the reason for their better overall hygiene score. Effective disposal of human waste prevents contamination of food with fecal organism.

While parity was not found to be significantly associated with either knowledge or practice the first time mothers in the FGDs tended to be younger, more hesitant and required more probing to elicit answers to questions.

11 CONCLUSIONS

5. Maternal knowledge is directly related to maternal practice of porridge preparation storage in the home
6. Half of the mothers had good knowledge of porridge preparation and storage and 71% were above the 50th percentile for practice.
7. Young mothers who had low levels of education and income are more likely to have poor knowledge and practice.
8. Piped water in the house and the type of toilet were the most significant factors associated with both knowledge and practice.

12 RECOMMENDATIONS

5. Improve access to piped safe water in the homes and encourage use of the water closet toilet.
6. Education of mothers in the antenatal, maternal and child health clinics and any other point of contact with mothers.
7. Encourage young girls to strive for excellence and obtain a minimum of secondary school education.
8. Encourage mothers to involve themselves in incoming generating activities in order to improve their income.

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14 ANNEX 1 A: CONSENT FORM FOR QUESTIONNAIRE

Study Identification Number:_____

Date:_____

Study title

Maternal knowledge and practice of porridge preparation and storage in the home.

Investigator's statement

My name is Dr. Kiragu Elizabeth Wanjiku and I am a postgraduate student at the University of Nairobi – Department of Paediatrics. I am requesting you to participate in a study that will descrbe maternal knowledge and practice of preparation and storage of porridge in the home. The purpose of this consent form is to give you information you will need to help you decide whether or not to participate in this study. Please read this form carefully. There are no risks involved in this study. You are free to ask any questions. I will be available to answer any questions that arise during the study and afterwards.

Brief description of Study

Food preparation and storage in the home is important in prevention of food borne diseases. These diseases are some of the causes of diarrhea which is a common childhood illness. I will be describing the knowledge and practice of mothers with regards to the preparation and storage of porridge, our local complimentary food, in the home. The study will generate information on how mothers prepare and store food for the child at home. All the information obtained will be held in strict confidentiality. Any information that may identify you will not be published or discussed with any unauthorized persons. We will however discuss overall findings regarding all who participated in the study without revealing your identity. Your participation in this study is purely voluntary and there is no monetary gain. It will not cost you financially to participate. You are free to withdraw if you so wish without any penalty.

If you have any questions about the study or your participation in the study you can contact me on this number 0728 246412.

If you have any questions on your rights as a research participant you can contact the Kenyatta National Hospital/ University of Nairobi Ethics and Research Committee by calling 2726300 Ext. 44102.

I confirm I have explained to the participant all relevant information about the study as indicated above.

Interviewer's Signature…… Date…….

I confirm the above study has been explained to me. I agree to participate in the study. I have had a chance to ask questions about the research, to which satisfactory answers have been given. I understand I can withdraw from the study at any time without any penalty.

Participants signature……..……Date……..

ANNEX 1B: RUHUSA YA KUULIZA MASWALI YA UTAFITI

Nambari ya kutambulisha _____

Tarehe _____

Anwani Ya Utafiti

Uchunguzi wa akina mama kuhusu ujuzi wa utayarishaji na uhifadhi wa uji nyumbani.

Taarifa Ya Mtafiti

Jina langu ni Dr. Kiragu Elizabeth Wanjiku na mimi ni mwanafunzi wa Chuo Kikuu cha Nairobi, kitengo cha Watoto. (Madaktari wa Watoto) Ningependa kukuomba ushiriki katika uchunguzi wa akina mama kuhusu ujuzi wa utayarishaji na uhifadhi wa uji nyumbani. Lengo la karatasi hii ni kukuarifu/ kukujulisha ili uweze kufanya uamuzi kama utakubali kushiriki katika utafiti huu au la. Tafadhali soma karatasi hii kwa makini. Una uhuru wa kuuliza swali lolote. Niko tayari kujibu maswali yoyote wakati au baada ya utafiti huu.

Mukhtasari Wa Utafiti

Utayarishaji na uhifadhi wa vyakula nyumbani ni muhimu kwa kuzuia magonjwa yanayotokana na vyakula. Baadhi ya magonjwa haya yanaweza kusababisha kuhara au kuendesha ambao hupatikana zaidi kwa watoto wachanga. Nitachunguza ujuzi na uzoefu wa akina mama katika utayarishaji na uhifadhi wa uji, ambacho ndicho chakula kinachopatiwa sana kwa watoto wachanga nyumbani. Uchunguzi huu utatupatia ujuzi jinsi akina mama wanavyoshugulikia chakula nyumbani. Habari zote zitakatolewa na washiriki zitahifadhiwa. Habari yoyote inayoweza kukutambulisha haita chapishwa au kujadiliwa na watu ambao hawashirki na utafiti huu. Tutajadili kwa jumla kuhusu washiriki bila kuwatambulisha. Ushiriki wako kataika utafiti huu ni ya kupenda kwako na hauna malipo yoyote. Hutalipa chochote kushiriki na una uhuru wa kujiondoa wakati wowote.

Ukiwa una maswali yoyote kuhusu utafiti huu au ushiriki wako unaweza kuwasiliana nami kupitia nambari hii: 0728 246412.

Ukiwa na maswali yoyote kuhusu utafiti huu au ushiriki wako unaweza kuwasiliana na Kenyatta National Hospital/ University of Nairobi Ethics and Research Committee, simu ya nambari 2726300 Ext 44102.

Nadibitisha kuwa nimemwelezea mshiriki yote yanayohusu utafiti huu.

Sahihi ya Mtafiti……..Tarehe……

Nadhibitisha kuwa nimeelezwa kuhusu utafiti huu. Nakubali kushiriki katika utafiti huu. Nimekuwa na fursa ya kuuliza maswali kuhusu utafiti na kupata majibu mwafaka. Naelewa kuwa naweza kujiondoa katika utafiti huu wakati wowote bila laamu.

Sahihi ya mshiriki ……Tarehe ……

15 ANNEX 2 A: QUESTIONNAIRE

Age _____

Marital status _____

Occupation _____

Residence _____

Age of index child _____

1. Who is responsible for preparation of most meals in the home?

- Parent ☐
- House help ☐
- An adult other than the above ☐
- Older child ☐

2. Have you had any formal education?

- Yes ☐ No ☐

3. If yes how many years did you complete in

- Primary school? _____
- Secondary school? _____
- Tertiary education? _____

4. How many people live in your house?

- Adult _____Children _____

5. How many rooms does your house have excluding toilets? _____

6. What type of floor do you have?

- Earthen ☐ Wooden ☐ Cement ☐ Tiled ☐
- Other _____

7. What type of walls do you have?

- Stone ☐ Wooden ☐ Iron sheets ☐ Earthen ☐

8. Do you have access to a toilet?

- Yes ☐ No ☐

9. What type of toilet?

- Water closet ☐ Pit latrine ☐

10. What kind of toilet is it?

- Own ☐ Shared free ☐ Shared at a cost ☐

11. If the toilet is shared at accost how much do you pay? _____
12. What is your source of water?

- Piped water in the house ☐ Community tap ☐ Water closet ☐
- Borehole ☐ Well ☐
- Other, describe _____

13. How much water do you use per day for the entire household if the source is not piped water in the house? _____
14. What fuel do you use to cook/

- Gas ☐ Electricity ☐ Kerosene ☐ Charcoal ☐
- Other, describe _____

15. Do you keep animals in the compound?

- Yes ☐ No ☐

16. What kind of animals?

- Dog and cats ☐ Chicken ☐ Cows/Goats / sheep ☐

17. Are the animals allowed to roam free in the compound?

- Yes ☐ No ☐

18. Are the animals allowed to roam into the house?

- Yes ☐ No ☐

19. What do you use daily to collect the child's waste?

- Nappies bought from the shop ☐ Disposable diapers ☐ Pieces of cloth ☐
- Other, describe _____

20. How do you dispose of the child's waste?

- Water closet ☐ Pit latrine ☐
- Other, describe _____

21. How do you dispose of other house hold waste?

- Garbage collectors ☐ Community dump ☐
- Other, describe _____

22. When do you wash your hands?

- After visiting the toilet ☐ Before preparing food ☐ Before eating ☐
- Before feeding the baby ☐ After eating ☐

23. Where do you prepare the food?

- On a counter ☐ On the floor ☐
- Other, describe _____

24. How often do you cook porridge for the child?

- For every feed ☐ Once a day ☐
- Other, describe_____

25. What kind of flour do you use to cook the porridge?

- one flour ☐ more than one flour ☐

26. If more than one flour is used

- Do you mix it yourself ☐ Buy it mixed ☐

27. Where do you buy the flour from?

- The supermarket ☐ Open air market ☐ Mill ☐
- Other, describe_____

28. What do you use to make the porridge?

- Water ☐ Breast milk ☐ Other milk ☐

29. Do you add anything to enrich the porridge?

- Yes ☐ No ☐

30. If so what do you add?

- Egg ☐ Sugar ☐ Margarine ☐
- Other, describe _____

31. At what point during the cooking is it added?

- When starting to cook ☐ When almost ready ☐
- Other, describe _____

32. How do you determine when porridge is fully cooked?

- Comes to a boil ☐ Taste with a spoon ☐
- Other, describe _____

33. How soon after it is ready is the child fed?

- Immediately ☐ Within 4 - 6hours ☐ Between 6 – 24 hours ☐
- More than 24 hours ☐

34. What is the left over porridge stored in?

- Flask ☐ A container with a cover other than a flask ☐ Open container ☐
- Other, describe _____

35. Where is the left over porridge stored?

- In the fridge ☐ Cupboard ☐
- Other, describe_____

36. Is left over porridge reheated before the child is fed?

- Yes ☐ No ☐

37. How long do you reheat the porridge?

- Until it boils ☐ Warm enough for the child ☐

38. How do you check the temperature of porridge before feeding the baby?

- Taste with a spoon ☐ Place small amount on the palm ☐ Dip finger in the food ☐
- Other, describe _____

39. Do you use separate utensils for the child?

- Yes ☐ No ☐

40. Do you wash the child's utensils with the rest of the family's?

- Yes ☐ No ☐

41. How do you dry the dishes?

- Open air ☐ With a cloth ☐

42. Where do you place the dishes to air dry?

- On a rack ☐ On the floor ☐ On the table or stool ☐
- Other, describe _____

43. How often do you wash the cloth for drying dishes with soap and hung to dry?

- After every use ☐ Once a day ☐
- Other, describe _____

ANNEX 2 B: MASWALI YA UTAFITI

Umri_____

Kuolewa _____

Kazi_____

Makaazi_____

Umri wa mtoto_____

1. Nani anatayarisha vyakula nyumbani sana?
   - Mzazi ☐ Msichana wa kazi ☐ Mtu mzima mwingine yeyote ☐
   - Mtoto mkubwa katika familia ☐
2. Je, una elimu yoyote ya shule?
   - Ndio ☐ La ☐
3. Kama ndio, ulifika kiwango gani?
   - Shule ya msingi ☐
   - Shule ya upili ☐
   - Chuo kikuu ☐
4. Ni watu wangapi wanaishi nyumbani mwenu?
   - Watu wazima ☐ Watoto ☐
5. Nyumba yenu ina vyumba vingapi, bila kuhesabu vyoo? _____
6. Kuna sakafu aina gani?
   - Udongo ☐ Mbao ☐ Simiti ☐ Vigae/tiles ☐
7. Kuna ukuta aina gani?
   - Mawe ☐ Mbao ☐ Mabati ☐ Udongo ☐
8. Kuna vyoo?
   - Ndio ☐ La ☐
9. Vyoo vya aina gani?
   - Vya kupiga bombo ☐ Vya shimo ☐
10. Hivi vyoo vinatumikaje?
    - Binafsi ☐ Vya umma bila malipo ☐ Vya umma kwa malipo ☐
11. Kama ni kwa malipo, mnalipa pesa ngapi? _____
12. Maji yenu yanatoka wapi?
    - Mfereji kwa nyumba ☐ Mfereji kwa jumla ☐ Maji ya shimo ☐

- Maji ya kisima ☐
- Nyingineyo (eleza) _____

13. Mnatumia kiasi gani cha maji ikiwa hauna mfereji nyumbani? _____
14. Mnatumia nini kupika?
    - Gesi ☐ Stima ☐ Mafuta ya taa ☐ Makaa ☐
    - Nyingineyo (eleza)_____
15. Mnafuga wanyama wowote nyumbani?
    - Ndio ☐ La ☐
16. Kama ndio, wanyama aina gani?
    - Mbwa au paka ☐ Kuku ☐ Ngombe, mbuzi, kondoo ☐
17. Wanyama hawa wanaruhusiwa kurandaranda nyumbani?
    - Ndio ☐ La ☐
18. Wanaruhusiwa kurandaranda ndani ya nyumba?
    - Ndio ☐ La ☐
19. Unatumia nini kuzoa kinyesi cha mtoto kila siku?
    - Nepi zinazonunuliwa dukani ☐ Daipa za kutupwa ☐
    - Viraka za nguo ☐
    - Nyingineyo (eleza_____
20. Mnatupaje kinyesi cha mtoto?
    - Choo cha kupiga bombo ☐ Choo cha shimo ☐
    - Nyingineyo,
      (eleza_____
21. Mnatupaje taka taka nyingine ya nyumba?
    - Wazoaji taka taka wa kulipwa ☐ Shimo la taka taka la jumla ☐
    - Nyingineyo, (eleza) _____
22. Ni muhimu kuosha mikino wakati gani?
    - Baada ya kwenda chooni ☐ Kabla ya kutayarisha chakula ☐
    - Kabla ya kula ☐ Kabla ya kulisha mtoto ☐
    - Baada ya kula ☐
23. Unanawa mikono wakati upi?
    - Baada ya kwenda chooni ☐ Kabla ya kutayarisha chakula ☐
    - Kabla ya kula ☐ Kabla ya kulisha mtoto ☐
    - Baada ya kula ☐

24. Unatayarisha chakula wapi?
    - Juu ya meza ☐ Sakafuni ☐
    - Nyingineyo, (eleza)_____
25. Unapaswa kupikia mtoto uji mara ngapi kwa siku?
    - Kwa kila mlo ☐ Mara moja kwa siku ☐
    - Nyingineyo, (eleza) _____
26. Unampikia mtoto uji mara ngapi?
    - Kwa kila mlo ☐ Mara moja kwa siku ☐
    - Nyingineyo, (eleza) _____
27. Unachanganya unga aina ngapi kutengeneza uji?
    - Moja ☐ Zaidi ya moja ☐
28. Una
    - Changanya uji mwenyewe ☐ Nunua uliochanganywa tayari ☐
29. Unatoa unga ya uji wapi?
    - Duka la jumla ☐ Sokoni ☐ Kusaga ☐
    - Nyingineyo, (eleza) _____
30. Unatumia nini kutengeneza uji?
    - Maji ☐ Maziwa ya mama ☐ Maziwa mengine ☐
31. Unaongeza chochote kuboresha uji?
    - Ndio ☐ La ☐
32. Kama ndio, unaongeza nini?
    - Mayai ☐ Sukari ☐ Siagi ☐
33. Unaongeza wakati gani?
    - Unapoanza kupika ☐ Uji ukiwa karibu kuiva ☐
    - Nyingineyo, (eleza) _____
34. Unajuaje uji umeiva?
    - Unapochemka ☐ Kuonja na kijiko ☐
    - Nyingineyo, (eleza) _____
35. Unamlisha mtoto baada ya muda upi uji ukiwa tayari?
    - Punde tu ☐ Baada ya saa 4- 6 ☐ Saa 6 hadi 24 ☐
    - Zaidi ya siku mmoja ☐
36. Uji unaobakia unahifadhiwa vipi?
    - Flaski ☐ Chombo kama sufuria au plastiki ambacho kina kifuniko ☐

- Chombo bila kifuniko ☐

37. Uji unaobakia unahifadhiwa wapi?
    - Katika fridge ☐ Kabati ☐
    - Nyingineyo, (eleza) _____
38. Uji unaobakia unapashwa moto kabla ya kupatiwa mtoto?
    - Ndio La
39. Uji unaobakia hupashwa moto kwa muda gani?
    - Mpaka uchemke ☐ Joto la kawaida kwa mtoto ☐
40. Unapimaje joto la uji kabla kulisha mtoto?
    - Kutumia kijiko ☐ Kuweka kiasi kidogo kwenye mkono ☐
    - Kuweka kidole katika uji ☐
    - Nyingineyo, (eleza) _____
41. Mtoto na familia wanatumia vyombo vya kula pamoja au mtoto ana vyake binafsi?
    - Ndio ☐ La ☐
42. Unasafisha vyombo vya mtoto pamoja na vya familia yote?
    - Ndio ☐ La ☐
43. Unakaushaje vyombo?
    - Unaachilia vikauke tu ☐ Na kiraka ☐
44. Unaweka vyombo wapi ili vikauke?
    - Chombo cha kukaushia vyombo ☐ Sakafuni ☐ Mezani ☐
    - Nyingineyo, (eleza) _____
45. Kama unatumia kiraka au taulo kukausha vyombo unaiosha na sabuni na kuianika mara ngapi kwa siku?

- Kila wakati unaotumia ☐ Mara moja kwa siku ☐
- Nyingineyo, (eleza) _____

16 ANNEX 3: CONSENT FORM FOR FOCUS GROUP DISCUSSION

Date:_____

Study title

Maternal knowledge and practice of porridge preparation and storage

Investigator's statement

My name is Dr. Kiragu Elizabeth Wanjiku and I am a postgraduate student at the University of Nairobi – Department of Paediatrics. I am requesting you to participate in a study that will describe maternal knowledge and practice of preparation and storage of porridge in the home. You will be participating in a discussion with other mothers in which you will be sharing your views on the subject. The entire discussion will be recorded and later transcribed into a document. The purpose of this consent form is to give you information you will need to help you decide whether or not to participate. Please read this form carefully. There are no risks involved in this study. You are free to ask any questions. I will be available to answer any questions that arise during the study and afterwards.

Brief description of Study

Food preparation and storage in the home is important in prevention of food borne diseases among others. I will be assessing the knowledge and practice of mothers with regards to the preparation and storage of porridge, our local complimentary food, in the home. The study will generate information on how mothers prepare and store food in the home. With your permission the discussion will be recorded and handled with the strictest confidentiality. The transcript of the record will bear no names that will identify you. We will however discuss overall findings regarding all who participated in the study without revealing your identity. Your participation in this study is purely voluntary and there is no monetary gain. It will not cost you financially to participate. You are free to withdraw if you so wish without any penalty.

If you have any questions about the study or your participation in the study you can contact me on this number: 0728 246412

If you have any questions on your rights as a research participant you can contact the Kenyatta National Hospital/ University of Nairobi Ethics and Research Committee by calling 2726300 Ext. 44102

I confirm I have explained to the participant all relevant information about the study as indicated above.

Interviewer's
Signature……..Date…….

I confirm the above study has been explained to me. I agree to participate in the study. I have had a chance to ask questions about the research, to which satisfactory answers have been given. I understand I can withdraw from the study at any time without any penalty.

Participants signature……Date……

ANNEX 3B: KUKUBALI KUSHIRIKI KWA MAJADILIANO

Tarehe _____

Anwani Ya Utafiti

Uchunguzi wa akina mama kuhusu ujuzi wa utayarishaji na uhifadhi wa uji nyumbani.

Taarifa Ya Mtafiti

Jina langu ni Dr. Kiragu Elizabeth Wanjiku na mimi ni mwanafunzi wa Chuo Kikuu cha Nairobi, kitengo cha Watoto, (Madaktari wa Watoto). Ningependa kukuomba ushiriki katika uchunguzi wa akina mama kuhusu ujuzi wa utayarishaji na uhifadhi wa uji nyumbani. Utashiriki katika majadiliano na wamama wengine ambapo mtaongea waziwazi juu ya vile mnavyotayarisha na kuhifadhi vyakula nyumbani. Mjadala wote utarekodiwa na baadaye utachapishwa vile vile. Lengo la karatasi hii ni kukuarifu/ kukujulisha ili uweze kufanya uamuzi kama utakubali kushiriki katika utafiti huu au la. Tafadhali soma karatasi hii kwa makini. Una uhuru wa kuuliza swali lolote. Niko tayari kujibu maswali yoyote yatakayoibuka wakati au baada ya utafiti huu.

Mukhtasari Wa Utafiti

Utayarishaji na uhifadhi wa vyakula nyumbani ni muhimu kwa kuzuia magonjwa yanayotokana na vyakula. Baadhi ya magonjwa haya yanaweza kusababisha kuhara au kuendesha ambao hupatikana zaidi kwa watoto wachanga. Nitachunguza ujuzi na uzoefu wa akina mama katika utayarishaji na uhifadhi wa uji, ambacho ndicho chakula kinachopatiwa sana kwa watoto wachanga nyumbani. Uchunguzi huu utatupatia ujuzi jinsi akina mama wanavyoshugulikia chakula nyumbani. Ushiriki wako utategemea ruhusa wako kurekodi majadiliano. Habari zote zitakatolewa na washiriki zitahifadhiwa. Habari yoyote inayoweza kukutambulisha haita chapishwa au kujadiliwa na watu ambao hawashirki na utafiti huu. Tutajadili kwa jumla kuhusu washiriki bila kuwatambulisha. Ushiriki wako kataika utafiti huu ni ya kupenda kwako na hauna malipo yoyote. Hutalipa chochote kushiriki na una uhuru wa kujiondoa wakati wowote.

Ukiwa una maswali yoyote kuhusu utafiti huu au ushiriki wako unaweza kuwasiliana nami kupitia nambari hii: 0728 246412.

Ukiwa na maswali yoyote kuhusu utafiti huu au ushiriki wako unaweza kuwasiliana na Kenyatta National Hospital/ University of Nairobi Ethics and Research Committee, simu ya nambari 2726300 Ext 44102.

Nadibitisha kuwa nimemwelezea mshiriki yote yanayohusu utafiti huu.

Sahihi ya Mtafiti……..Tarehe……

Nadhibitisha kuwa nimeelezwa kuhusu utafiti huu. Nakubali kushiriki katika utafiti huu. Nimekuwa na fursa ya kuuliza maswali kuhusu utafiti na kupata majibu mwafaka. Naelewa kuwa naweza kujiondoa katika utafiti huu wakati wowote bila laamu.

Sahihi ya mshiriki ……Tarehe ……

17 ANNEX 4: FOCUS GROUP DISCUSION GUIDELINE

PARTICIPANT INITIALS	AGE	AGE OF INDEX CHILD	EDUCATIONAL LEVEL	MARITAL STATUS

INTRODUCTION

I introduced myself and my two assistants and outlined their roles as moderators. Participants introduced themselves by their first names.

PREAMBLE

The topic of the day was food safety and hygiene practices in the home the results of which gave an idea of how mothers handled food for the baby in the home. Mothers were selected because they had started complementary feeds in their children

GROUND RULES

1. There were no right or wrong answers only different points of view.
2. The discussion was recorded therefore only one person could speak at a time.
3. Participants were on first name basis.
4. Participants did not need to agree with one another but had to listen respectfully to others views.
5. Phones were switched off.

QUESTIONS

1. Unahifadhi vyakula nyumbani vipi?
   How do you store food in your home?
2. Ni tahadhari gani unavyochukua wakati unahifadhi vyakula?
   What precautions do you take when storing food?
3. Unashugulikia vipi uji kabla ya kupakulia mtoto?
   How do you handle coked porridge before serving it?
4. Una mausia gani kuhusu uhifadhi wa vyakula?
   What concerns do you have regarding food storage?
5. Unajua njia yoyote za kiasili za kuhifadhi vyakula?
   Do you know any traditional methods of food storage?
6. Ni mara ngapi unayotayarishia mtoto chakula kwa siku?
   How often do you prepare food for the baby in a day?
7. Kuna shida yoyote unapotayarishia mtoto chakula?
   What problems do you face in the preparation of food for the baby?