

Effect of a Nutrition Education Intervention on Food Safety Knowledge, Attitudes and Practices of Mothers of Children under 5 Years in the Peri-Urban Areas of Bobo-Dioulasso: Before and after Study

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Abstract

Background: This study assessed the effect of a nutrition education intervention. This intervention aimed to improve the knowledge, attitudes, and practices of mothers on food safety in the peri-urban areas of Bobo-Dioulasso in Burkina Faso. **Methods:** A total of 243 mothers of children under 5 years in the peri-urban of Bobo-Dioulasso were administered the FAO questionnaire for food safety knowledge, attitudes, and practices assessment during two cross-sectional surveys, before and after the intervention, in January and October 2017. The intervention included two components consisting of a theoretical phase (counselling and discussion) and cooking demonstrations implemented for ten months. To account for the before-and-after design of the study, the McNemar's test was used to assess the effect of the intervention on food safety KAP of mothers of children under 5 years. **Results:** The mean age of mothers was 29 ± 6.2 years and 50.6% of them were between 20 and 29 years old. One for knowledge (cooking thoroughly with, p-value = 0.0001) and another for attitudes (perceived benefits of reheating leftovers before eating them, p-value = 0.0001), significantly increased after the intervention. In terms

of food safety practices, all the indicators (cleaning of dirty surfaces, plates and utensils and storage of perishable foods) significantly increased (all $p = 0.0001 < 0.05$). **Conclusion:** This study provided some evidence of an effective nutrition education intervention for improving maternal KAP on food safety for their child's feeding.

Keywords

Nutrition Education Intervention, Knowledge, Attitudes and Practices, Food Safety, Mothers of Children under 5 Years, Burkina Faso

1. Introduction

Food safety significantly affects public health worldwide [1]. According to the World Health Organization, an estimated 600 million—almost 1 in 10 people in the world—fall ill after eating contaminated food and 420,000 die every year, resulting in the loss of 33 million healthy life years [2]. Food safety is a universal precondition necessary for the achievement of good complementary feeding outcomes for children 6 - 23 months of age [3]. This is particularly because complementary foods are introduced at 6 months, a point in time at which breast milk solely cannot adequately support a child's nutrient needs for optimal growth and the children have an underdeveloped immune system [4]. In many low- and middle-income countries, contamination of complementary foods is one of the major factors that compromise the nutritional outcome of complementary feeding largely due to the occurrence of diarrheagenic foodborne diseases caused by nontyphoidal Salmonella and *Escherichia coli* among others [5]. Evidence in the literature shows that local production of safe complementary foods and their utilization necessitates that caregivers practice hygienic food behavior [6]. This makes efforts to address food safety challenges, especially among caregivers of children 6 - 23 months, from a behavioral viewpoint extremely important in realizing good nutrition outcomes and attainment of sustainable development goal 3, good health and well-being [7].

Even though locally produced complementary foods are widely acceptable, used, and nutritious, their microbiological safety is of major public health concern [8]. It is important to note that the safety of such locally produced complementary food is largely dependent on the food-handling practices of caregivers involved in their preparation and utilization [9]. Thus, sanitary practices during the preparation of such products have to be strictly followed to minimize the occurrence of foodborne illnesses among children fed on locally-made complementary foods [10].

Additionally, most rural communities in Burkina Faso produce complementary foods that are largely plant-based comprising mainly cereals and legumes among others [11]. The locally produced complementary foods are potentially prone to microbial contamination if food-handling practice is not stringently

adhered to. Therefore, to ensure that children 6 - 23 months are fed microbiologically safe, locally produced complementary foods, it is vital that caregivers have sufficient food safety knowledge and a positive attitude associated with food-handling practices from the production to the consumption stages [12].

Good hygiene practices, especially hand washing with soap, reduce the risk of diarrhea by 23% [13].

However, despite the reported high occurrence of foodborne diseases among children under 5 years (WHO, 2015), the caregivers' Knowledge, Attitude, and Practices (KAP) regarding food safety of locally produced complementary foods in the context of the rural environment have largely remained under-investigated [14]. Studies assessing the effect of mothers' KAP on the outcome of complementary feeding have largely been focused on aspects associated with nutrient quality, quantity, and frequency [15].

Nutrition education on appropriate feeding and hygiene practices that target mothers of infants and young children has been reported to significantly improve knowledge, nutritional status, and minimize disease [16].

Thus, mothers' knowledge, attitudes, and practices toward the safety of complementary food formulae produced in rural domestic environments need to be adequately investigated.

Hence, the aim of this study was to determine the effect of a nutrition education intervention on food safety knowledge and attitude, and food hygiene practices of the mothers of children under five years in the peri-urban areas of Bobo-Dioulasso in Burkina Faso.

2. Materials and Methods

2.1. Study Setting and Period

The study was carried out among mothers of under-5 children who lived in all the peripheral sectors of Bobo-Dioulasso, the second largest city and the economic capital of Burkina Faso. The baseline was completed at the beginning of January 2017 and the endline at the end of October 2017.

2.2. Evaluation Design

This was a quasi-experimental study with a pre- and post-intervention design used to assess the effect of the nutrition education intervention on food safety KAP of mothers of under 5 children. The primary outcome of the study was the change in children's dietary diversity after the intervention.

2.3. Study Population, Sample Size and Sampling

The study population was mothers of children under 5 years of age. The Emergency Nutrition Assessment (ENA) software (<https://www.nutrisurvey.de/ena2011/>) was used to calculate the sample size [17]. Using a proportion of children meeting the minimum acceptable diet in Bobo-Dioulasso set at 9.5% [18], a precision of 5% and a design effect of 1.5, we obtained a sample size of 216 inflated to 243 ac-

counting for a 10% non-response rate. Mothers/caregivers of under-5 children who live in seven peri-urban neighborhoods of Bobo-Dioulasso (sectors 11, 15, 17, 21, 22, 24 and 25) and who accepted to participate in the study were recruited after provision of an oral consent. All mothers of under-5 children in the seven peri-urban neighborhoods constituted the source population. These mothers were randomly selected.

2.4. Description of the Nutrition Education Intervention

The principle of the nutrition education intervention was based on the study from Isobel R Contento [19]. The intervention had two components: 1) the first part of the nutrition education was a theoretical phase. This phase consisted of providing counselling to mothers to build skills for appropriate Infant and Young Child Feeding (IYCF) practices and cooking skills; 2) the second part was an action component based on cooking demonstrations for complementary feeding, to facilitate mothers' ability to practice through cooking demonstrations [19].

The practical phase of the intervention consisted of cooking demonstrations and took place every time after counseling. These demonstrations took place in the households of community leaders where study participants gathered.

The nutrition education of mothers started immediately after the baseline survey in January 2017 and ended in October 2017 before the endline survey. Trained community-based health workers provided the nutrition education to mothers in Dioula, the local language, and French. The education sessions were conducted for ten consecutive months. Each session was done once a week. The duration of each session was 2 hours. Face-to-face counseling was provided in addition to the practical demonstration. Active lectures, posters, note pad, brochures, and practical culinary demonstrations were the tools/methods used during the nutrition education sessions. Manual standard-based posters and guidelines use in previous studies by Avula *et al.* and Muluye *et al.* were used for the sessions [20] [21].

Key messages provided during the sessions included: breastfeeding, dietary diversification, amount, and frequency of feeding, and local recipes for complementary feeding. The interviewers were trained on the questionnaire over a period of 14 days. At the end of the training, the questionnaire was validated by a pre-test. Data were collected using the questionnaire validated during the training course.

2.5. Data Collection

Baseline and endline data were collected using the same semi structured questionnaire. The questionnaire was administered the mothers by the same trained enumerators to reduce the noise introduced in data by multiple enumerators (see the questionnaire in **Appendix**). The questionnaire consisted of a list of items assessing mothers' knowledge, attitudes and practices on food safety regarding infant and young child feeding including questions on socio-demographic and economic characteristics [22] [23]. The structured questionnaire was developed based on the guidelines document of the United Nations Food and Agriculture

Organization (FAO) for assessing nutrition related knowledge, attitudes and practices [22].

2.6. Study Variables

2.6.1. Variables for Assessing the Effectiveness of the Intervention

The evaluation of the nutrition education intervention was focused on changes in the knowledge, attitudes, and practices of mothers after the intervention. The variables of food safety and hygiene knowledge (modalities were “Know” or “Don’t know”) were: 1) Knowledge of cooking thoroughly; 2) knowledge of storage of perishable foods; 3) knowledge of washing raw fruits and vegetables. The variables for food safety and hygiene attitudes (modalities were either “Perceived severity”, “Perceived barriers”, or “Perceived benefits”) were: 1) Food poisoning/sickness from eating spoiled food; 2) reheating leftovers before eating them; 3) washing fruits and vegetables with clean water. The variables for food safety and hygiene practices (modalities were “Know” or “Don’t know”) were: 1) Cleaning of dirty surfaces, plates, and utensils; 2) storage of perishable foods.

2.6.2. Socio-Demographic Variables of Participants

These variables were maternal age, education, marital status, occupation, and child age and sex.

2.7. Data Management and Analysis

Data were entered using EpiData 3.1. software. In addition to the internal consistency checks that were set when the data entry program was developed, the database was cleaned beforehand. Data analysis was performed using SPSS 25 software. For the descriptive analysis each variable was summarized using frequency/percentage and 95% confidence interval or mean and standard deviation depending on the type of the variable. The effect of the intervention was assessed using the McNemar’s test. p-value less than 0.05 was considered statistically significant.

2.8. Ethical Considerations

The required permissions were obtained from the regional Director of health and from the chief doctors of the health districts of Do and Dafra in the Hauts-Bassins region. The informed consent of the mothers of children under 5 years was requested before any interview. The mothers had the right to withdraw from the study at any stage and were assured about the confidentiality of their answers.

3. Results

3.1. Socio-Economic Characteristics of the Mothers and Children “Included in the Assessment Surveys Carried out before and after the Nutrition Education Intervention

A total of 243 mothers of children under-5 were included in the baseline and endline assessment surveys. The characteristics of children and their mothers are

Table 1. Socio-economic characteristics of the mothers and children included in the assessment surveys carried out before and after the nutrition education intervention.

Variables	Frequency (n)	Percentage (%)
Maternal age categories (years)		
≤19	14	5.8
20 - 29	123	50.6
≥30	106	43.6
Maternal religion		
Muslim	183	76.3
Catholic	43	17.9
Protestant	14	5.8
Maternal education		
No schooling	143	59.6
Primary school	62	25.8
Secondary school and higher	35	14.6
Maternal marital status		
Single	8	3.3
Couple	235	96.7
Maternal occupation		
Employed	65	27.7
Unemployed	170	72.3
Child age categories (months)		
<6	4	1.6
6 - 11	34	14.0
12 - 23	93	38.3
≥24	112	46.1
Child sex		
Male	117	48.1
Female	126	51.9

presented in **Table 1**. The mean age of mothers was 29 ± 6.2 years. About half (50.6%) of the mothers were between 20 and 29 years old. In addition, 59.6% of the mothers had no school education, and more than two thirds of them were not employed (**Table 1**). Almost of the children aged 12 months or more.

3.2. Maternal Knowledge on Food Safety for Children under 5 Years before and after the Nutrition Education Intervention

According to **Table 2**, the results show the effect of the nutrition education intervention on food safety knowledge among mothers. The proportions of mothers with the whole set of knowledge on food safety increased at the end of the intervention. However, the difference in the proportion of mothers before endline and baseline was only significant for the knowledge related to “cooking thoroughly the foods”.

Table 2. Comparison of maternal knowledge on food safety of children under 5 years before and after the nutrition education intervention.

Variables	Before the intervention n (%)	After the intervention n (%)	p-value ^a
Cooking thoroughly			0.0001
Know	204 (84.3)	222 (91.7)	
Don't know	38 (15.7)	20 (8.3)	
Storage of perishable foods			1.00
Know	225 (96.7)	235 (97.1)	
Don't know	8 (3.3)	7 (2.9)	
Washing raw fruits and vegetables			1.25
Know	225 (94.1)	232 (95.9)	
Don't know	14 (5.9)	10 (4.1)	

^a: McNemar's tests.

3.3. Maternal Attitudes Related to Food Safety for Children under 5 Years before and after the Nutrition Education Intervention

Table 3 presents the effect of the nutrition education intervention on maternal attitudes related to food safety. There was a positive effect of the intervention only on the perceived benefits of reheating leftovers before eating good perception of perceived benefits of food poisoning with an increased proportion of mothers with that attitude (86.7% vs 93%). For the other variables, there were no beneficial effects of the education intervention, namely food poisoning and the washing fruits and vegetables with clean water.

Table 3. Comparison of maternal food safety attitudes for children under 5 years before and after the nutrition education intervention.

Variables	Before the intervention n (%)	After the intervention n (%)	p-value ^a
Food poisoning			
Perceived susceptibility			0,22
Likely	228 (94.2)	232 (95.9)	
Not likely	14 (5.8)	10 (4.1)	
Perceived severity			0.34
Serious	225 (93.0)	229 (94.6)	
Not serious	17 (7.0)	13 (5.4)	
Reheating leftovers before eating them			
Perceived benefits			0.0001
Good	209 (86.7)	225 (93.0)	

Continued

Not good	32 (13.3)	17 (7.0)	
Perceived barriers			0.63
Difficult	7 (2.9)	8 (3.3)	
Not difficult	234 (97.1)	234 (96.7)	
Washing fruits and vegetables with clean water			
Perceived benefits			1.00
Good	228 (94.6)	230 (95.0)	
Not good	13 (5.4)	12 (5.0)	
Perceived barriers			0.38
Difficult	11 (4.5)	7 (2.9)	
Not difficult	231 (95.5)	235 (97.1)	

^a: McNemar's tests.

Table 4. Comparison of maternal food safety practices for children under 5 years before and after the nutrition education intervention.

Variables	Before the intervention n (%)	After the intervention n (%)	p-value ^a
Cleaning of dirty surfaces, plates and utensils			0.0001
Know	211 (87.6)	224 (92.6)	
Don't know	30 (12.4)	18 (7.4)	
Storage of perishable foods			0.0001
Know	128 (53.6)	223 (92.1)	
Don't know	111 (46.4)	19 (7.9)	

^a: McNemar's tests.

3.4. Maternal Practices on Food Safety for Children under 5 Years before and after the Nutrition Education Intervention

Table 4 presents the effect of the nutrition education intervention on maternal food safety practices for children under 5 years. There was a positive effect of the intervention on the indicators of food safety practices assessed in this study. The proportions of mothers who reported practicing the cleaning of dirty surfaces, plates and utensils, and the storage of perishable foods were significantly higher (by about 5 and 38.5 percentage points, respectively) during the endline compared to the baseline survey (**Table 4**).

4. Discussion

The current study showed that it is possible to change entrenched food safety knowledge, attitudes and practices using a nutrition education intervention, even in environmentally challenging conditions such as in peri-urban areas of Bo-

bo-Dioulasso, Burkina Faso. Many of the target behaviors happened in sequence, such as these indicators: immediately after reheating the food, the mother served the food using serving utensils, then storage of perishable foods, and stored the leftover food properly.

This is the first known study that assessed the effect of a nutrition education intervention on mothers' knowledge, attitudes and practices related to food safety for children under 5 years in Burkina Faso. The nutrition education intervention improved some of the indicators of the mothers' knowledge, attitudes, and practices in relation with food safety. Specifically, the proportions of mothers practicing the cleaning of dirty surfaces, plates and utensils practices, and the storage of perishables foods practices significantly increased after the intervention. Also, the proportions of mothers with knowledge on "cooking thoroughly" or attitude related to the perceived benefits of reheating leftovers before eating increased significantly. There was no effect of the intervention on the other indicators of food safety KAP of the mothers.

The improvement observed in mothers' knowledge, attitudes and practices related to food safety could be explained by the length of the nutrition education intervention period as a 10-month exposure to counselling and demonstrations have more chance to influence the behavior of the participants. The results obtained in this study are in line with the study of Mahmudiono *et al.* conducted in Indonesia among food handlers where they reported an increase of the knowledge, attitudes and behaviors in the nutrition education intervention group [24]. They are also similar to the findings from Wahyuningsih *et al.* who reported a positive effect of a nutrition intervention via media card and whiteboard in 2015 [25].

In terms of knowledge of mothers of food safety, most of the mothers knew the importance of preparing safe food to prevent foodborne illnesses. Only the knowledge of mothers on cooking thoroughly improved significantly at the end of the intervention compared to the beginning. This shows that mothers understood the risk to food contamination. A literature review found the same results on the effectiveness of consumer education on food safety conducted by Young *et al.* [26]. In addition, similar findings were reported by Eunice Achiro *et al.* in Uganda in 2023 [27]. Food safety and hygiene knowledge is an important element for professional knowledge and skills of food handlers [28]. This finding was in line with the findings of Hermawati *et al.* where the educational media through film encouraged mothers to practice food safety for children [29]. Also, this result is supported by the study by Chellaiyan *et al.* in 2018 about food safety awareness and food handling practices among rural population of Tamil Nadu. These authors reported that more than one third of the study participants had adequate knowledge [30]. Other food safety indicators in terms of knowledge of mothers did not increase after the intervention.

In the context of preventing risky behaviors that food safety and hygiene training should turn into behavior and then such behavior should become a habit [31]. This study showed a positive attitude of mothers of children under 5 years

caregivers toward perceived benefits for reheating leftovers before eating them after the intervention. Similar study carried out in Nepal found an increase proportion of participant with good attitude [32].

It is known that trainings must be provided on regular basis to ensure the adoption of food safety habit; however, the trainings which are not maintained on regular basis do not result with behavioral changes and hinder the acquisition of habits [28]. In the current study, it was shown that nutrition education paved the way for the mothers to adopt food safety practices in terms of cleaning dirty surfaces, plates, and storage of perishables foods. Similar to the study of Mohammed Zaky El-Khabiry *et al.* who demonstrated that about one-fifth of the studied mothers had appropriate practices related to food safety [33]. In addition, similar studies on the effectiveness of cleaning dirty surfaces in Nepal [32]. In addition to the duration of the intervention mentioned above, there are other possible explanations including the combined approaches (health facility-based and community-based intervention) implemented in this intervention. This second explanation was also mentioned in a study conducted in Mexico [34].

A nutrition education intervention should focus on correcting the undesirable practices such as cleaning of dirty surfaces, storage of perishable foods and attitudes (for example reheating leftovers before eating them). Burkina Faso's food safety laws should be revised to include a requirement for women with children under 5 years to get periodic food safety training.

The major limitation of the intervention was the inability to include the heads of households along with the mothers in the intervention as they are supposed to be the food providers of the households. And this might have an implication in terms of food safety for children under 5 years.

5. Conclusion

This study showed that the 10-month nutrition education intervention was effective in improving some indicators of mothers' knowledge, attitudes, and practices regarding food safety for children under five years in the peri-urban areas of Bobo-Dioulasso, in Burkina Faso. The indicators that were positively affected by the intervention were the knowledge of cooking thoroughly, the attitude related to the perceived benefits of reheating leftovers before eating, the practices of cleaning dirty surfaces, plates and utensils and storage of perishable foods. The approach used to deliver this nutrition education package could be scaled and disseminated in other peri-urban areas of Burkina-Faso. Other studies in urban areas will be necessary to potentially generalize this nutrition education intervention to the entire region of Bobo-Dioulasso and Burkina Faso.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Adaptable KAP Model Questionnaires

This document is an extract from the FAO publication *Guidelines for assessing nutrition-related knowledge, attitudes and practices* (2014), also called KAP manual, available at: <http://www.fao.org/docrep/019/i3545e/i3545e00.htm>.

It contains some of the document's annexes, namely:

- informed consent and socio-demographic questionnaires, and
- nutrition-related KAP model questionnaires (modules).

These questionnaires need to be adapted to the local context and to the requirements of the specific project or intervention in which they are going to be used. Hence, they are herewith provided in MS Word format, for easy adaptation and reproduction.

Informed Consent Form and Socio-Demographic Questionnaire for Caregivers of Infants and Young Children (0 - 6 Months and 6 - 23 Months)

Informed consent and confidentiality of interviews

Good morning/afternoon, Mr/Mrs _____. We are from **[insert the name of your organization]**. We are working on a project concerned with nutrition and education in which you could participate/participated. **[Include the objectives and a short description of the project]**. Now, the project is just starting/almost finished **[select depending if the project is just starting or almost finished]** and we are completing a survey among participants to know more about their knowledge, attitudes and practices to do with nutrition. The interview will take about **[time estimated to conduct the interview]**. All the information we obtain will remain strictly confidential and your answers and name will never be revealed. Also, you are not obliged to answer any question you do not want to, and you may stop the interview at any time.

The objective of this study is to **[evaluate the effectiveness of an intervention (if outcome evaluation) or assess the nutrition situation (if situation analysis)]**. This is not to evaluate or criticize you, so please do not feel pressured to give a specific response and do not feel shy if you do not know the answer to a question. I am not expecting you to give a specific answer; I would like you to answer the questions honestly, telling me about what you know, how you feel, the way you live and how you prepare food. Feel free to answer questions at your own pace.

Do you agree to participate in this interview?

Yes ___ No ___ *If yes, continue to the next question; if no, stop the interview.*

Do you have any question before we start? (*Answer questions*)

May I start now?

Socio-Demographic Questionnaire for Caregivers

Caregiver		
1. Name and code	What is your name? <i>Insert respondent code</i>	-----
2. Sex	<i>Insert the sex of the caregiver</i>	Male <input type="checkbox"/> Female <input type="checkbox"/>
3. Relationship	What is your relationship with the child you take care of?	Mother <input type="checkbox"/> Father <input type="checkbox"/> Grandmother/ Grandfather Other <input type="checkbox"/>
4. Caregiver's age	When is your birthday? <i>Probe if necessary.</i>	__/__/____
	On what day and in which month and year were you born?	day month year
4. Caregiver's age	How old are you? <i>Probe if necessary.</i>	Age in completed years
	What was your age at your last birthday? <i>If the information conflicts with the previous question, determine which one is more accurate</i>	--
5. Parity (only for women)	How many children do you have? <i>For pregnant women: ask if this is her first pregnancy</i>	Number of children -- First pregnancy <input type="checkbox"/>
6. Geographical characteristics	Where do you live? <i>Adapt to the local geographical characteristics: district, city, village, section, tribe, etc.</i>	<input type="checkbox"/> District
		<input type="checkbox"/> City
		<input type="checkbox"/> Village
		<input type="checkbox"/> Section
		<input type="checkbox"/> Other
7. Educational level	Have you ever attended school? <i>If yes, continue asking.</i>	None <input type="checkbox"/> Primary school <input type="checkbox"/> Secondary school <input type="checkbox"/> Higher <input type="checkbox"/>
	What is the highest level of school you attended?	Grade --
7. Educational level	What is the highest grade/form/year you completed at that level?	Grade --
		--
Infant/young children		
1. Child's name	What is your child's name?	
2. Child's sex	Is (<i>the name of the child</i>) male or female?	Male Female

Continued

3. Child's age	When is your child's birthday? <i>Probe if necessary:</i>	
	On what day and in which month and year was (<i>name of the child</i>) born?	___/___/___
	Does he/she have a health/vaccination card with the birth date recorded?	year month day
	<i>If yes, record the date of birth as documented in the card</i>	
	How old was (<i>name of the child</i>) at his/her last birthday?	Age in completed years
	<i>Record age in completed years and/or months</i>	Age in completed months
		--

Module 9: Food Safety

Explain to the participant:

I am going to ask you some questions about food safety. Please let me know if you need me to clarify any of my questions. Feel free to ask any question you may have.

Practices**1) Question P.1: Cleaning of dirty surfaces, plates and utensils**

After you have prepared dinner, kitchen surfaces, pots, pans, plates and utensils are dirty. Can you describe how you clean them usually?

-
- Scrape excess food into rubbish bin*
 - Wash with hot water*
 - Wash with detergent*
 - Don't know/no answer*

Preliminary analysis

Number of correct responses ___

2) Question P.2: Storage of perishable foods

How do you store perishable fresh foods such as raw meat, poultry and seafood?

-
- In the refrigerator (below 5°C)/cool box*
 - Covered (protected from insects, rodents, pests and dust)*
 - Separated from cooked or ready-to-eat foods*
 - Other*
 - Don't know/no answer*

Preliminary analysis

Number of correct responses ___

Knowledge**1) Question K.1: Separation of raw and cooked foods**

Why should you prevent raw meat, offal, poultry and seafood from touching other foods such as those that are cooked or ready to eat?

-
-
- Raw animal foods often contain germs (which may be transferred to cooked and ready-to-eat foods)*
 - Other*
 - Don't know*

Preliminary analysis

- Knows
- Does not know

2) Question K.2: Cooking thoroughly

When cooking soups and stews, what sign shows that these are ready and safe to be served?

-
-
- They are boiling/well cooked*
 - Other*
 - Don't know*

Preliminary analysis

- Knows
- Does not know

3) Question K.3: Storage of perishable foods

What kinds of food should be placed in the refrigerator or in a cool place, such as an icebox or cool box?

-
-
- Perishable foods*
 - Meat, offal*
 - Poultry*
 - Fish*
 - Foods from the sea or lake*
 - Milk/dairy products*
 - Cooked foods*
 - Other*
 - Don't know*

Preliminary analysis

Number of correct responses

4) Question K.4: Storage of leftovers in a cool/cold place

Why should someone avoid eating leftovers that were not kept in a cool place?

- Because food is not safe anymore*
- Foods get spoiled (germs multiply very quickly and can cause illness)*
- Higher temperatures make germs grow faster*
- Other*
- Don't know*

(Any of the three first response options is correct)

Preliminary analysis

- Knows
- Does not know

5) Question K.5: Washing raw fruits and vegetables

What should you do before eating raw fruits and vegetables?

- Wash them with clean water*
- Other*
- Don't know*

Preliminary analysis

- Knows
- Does not know

Attitudes

Attitudes towards a health or nutrition-related problem

1) Food poisoning/sickness from eating spoiled food

Perceived susceptibility

How likely do you think you are to get sick from eating spoiled food?

- Not likely
- You're not sure
- Likely

If Not likely:

Can you tell me the reason why it is not likely?

Perceived severity

How serious do you think it is to be sick from eating spoiled food?

- Not serious
- You're not sure
- Serious

If Not Serious:

Can you tell me the reason why it is not serious?

Attitudes towards an ideal or desired nutrition-related practice¹

2) Keeping perishable food in a cool place, for example in a cool box or in the refrigerator

Perceived benefits

How good do you think it is to keep meat, poultry, fish, seafood or cooked food in a cool place, for example in a cool box or in the refrigerator?

- Not good
- You're not sure
- Good

If Not good:

Can you tell me the reasons why it is not good?

Perceived barriers

How difficult is it for you to keep these foods in a cool box or in the refrigerator?

- Not difficult
- So-so
- Difficult

If Difficult:

Can you tell me the reasons why it is difficult?

3) Reheating leftovers before eating them

Perceived benefits

How good do you think it is to reheat leftovers before eating or serving them?

- Not good
- You're not sure
- Good

If Not good:

Can you tell me the reasons why it is not good?

Perceived barriers

How difficult is it for you to reheat leftovers before eating or serving them?

- Not difficult
- So-so
- Difficult

If Difficult:

¹For additional practices to inquire on, refer to the WHO's *Five Keys for Safer Food Manual 12*. WHO (2006) *Five Keys to Safer Food Manual*, World Health Organization, Geneva, Switzerland and available at: <https://www.who.int/publications/i/item/9789241594639>.

Can you tell me the reasons why it is difficult?

4) Washing fruits and vegetables with clean water

Perceived benefits

How good do you think it is to wash fruits and vegetables with clean water?

- Not good
- You're not sure
- Good

If Not good:

Can you tell me the reasons why it is not good?

Perceived barriers

How difficult is it for you to wash fruits and vegetables with clean water?

- Not difficult
- So-so
- Difficult

If Difficult:

Can you tell me the reasons why it is difficult?

Thank you very much for your participation.