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Knowledge of Food-Borne Diseases and Food Safety Practices among Mothers of Under-five Children in Ijebu-Ode, Ogun State

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Abstract

Children younger than five years are at an increased risk of foodborne diseases and related health complications because their immune systems are still developing. Therefore, this study assessed knowledge of food borne diseases and food safety practice among mothers of under-five children in Ijebu-Ode area of Ogun State. A descriptive cross-sectional design was adopted, and a multistage sampling technique was used in selecting 205 mothers of under-five children who brought their children for immunisation at some selected Primary Health Centers of the study area. A validated questionnaire titled; Knowledge of Food Borne Diseases and Food Safety Practice was used in gathering information. Knowledge scale of 0-19 was adopted and categorized as good: (≥14.0), fair knowledge: (8.0-13.9) and poor: (0-7.9). Practice scale of 0-32 was adopted and categorised as: good (≥23.0), fair knowledge: (12.0-.22.9) and poor: (0-11.9). Data were analysed using descriptive statistics of frequency and percentage for research questions and student-test and chi-square for the research hypotheses. Majority of the mothers were between the ages 20-29 years (47.3%) and self- employed (67.3%). About 89.7% of mothers possessed good knowledge of food borne-diseases and 74.1% practice food safety. Significant difference between knowledge of food-borne diseases and food safety practices (p-value = 0.000) was established. Age, level of education, and marital status were found to be significantly associated with food safety practices. Mothers of under-five children in Ijebu-Ode, possessed a good knowledge of food-borne diseases and also practiced food safety to a greater extent. Community training on practice of food safety was recommended.

Keywords: Knowledge, under-five, food-borne diseases, food safety practices

INTRODUCTION

Prevalence of food borne diseases has been reportedly high among the population that do not have control over what they consumed, like the children, elderly and sometimes the sick people. The global burden of illnesses caused by food borne diseases (FBDs) is disproportionately burdened on the populations of low- and middle-income nations in the Asian and African continents, with children being the most severely impacted, likely contributing to high child malnutrition rates (WHO, /FAO, 2019). FBDs cover a wide spectrum of illnesses and are known to be of public health importance worldwide, with children under five severely affected (WHO 2015), with the numbers incredibly higher in sub-Saharan Africa (Kirk *et al*., 2017).

For context, evidence from epidemiological data highlights that at least 70% of diarrhoea-associated pathogens in children are contracted via contaminated food (Chidziwisano *et al*., 2019). Pathogen-contaminated foods can result in FBDs, which may lead to long-term impairments or even death (Ruby *et al*.2019). Children younger than five years are at an increased risk for foodborne illness and related health complications because their immune systems are still developing. This is because young children with developing immune systems cannot fight off infections as compared with adults and they also produce

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less stomach acid that kills harmful bacteria, making it easier for them to get sick (United State Centers for Disease Control and Prevention). The highest burden per population of foodborne diseases was observed in Africa, followed by Southeast Asia with the highest burden of stunting among under-five children (UNICEF/WHO, 2021). Unhygienic preparation and handling of foods is a major source of gastrointestinal diseases, as an immature immune system renders young children vulnerable to foodborne pathogens (Ehuwa *et al*., 2021).

Diarrhoea and other similar diseases are directly linked with malabsorption of macro and micro nutrients, fluid losses, and reduced appetite consequently resulting in several childhood nutritional problems, such as wasting and stunting (Derso *et al*., 2017). Universally, foodborne infection greatly threatens public health and socioeconomic progression due to the associated morbidity and mortality (Devleesschauwer *et al*., 2018) A study was carried out among 265 children to investigate the typical food safety practices in a Bangladeshi slum context using Malnutrition and Enteric Disease (MAL-ED) birth cohort data in order to explore if stunting among school-age children was associated with various components of food safety. About 26% were reported to be stunted and caregivers' hand washing practice after using the toilet, treatment of drinking water, presence of insects/pests in the cooking area, and child's eating ready-made/street food more than three times per day were significantly associated with stunting (Sanin et al., 2022).

Achiro *et al*., (2023) reported caregivers' sufficient food safety knowledge (74.1%), positive food safety attitude (68.1%) and poor food hygiene practices among caregivers of children 6–23 months of age in Amuru and Nwoya districts, Northern Uganda. A community based cross-sectional study was carried out in 2019 at Debarq town, Amhara region, Northwest Ethiopia to measure the food safety attitude and associated factors among mothers of under-five children. Poor food safety attitude of the mothers was reported, and educational status, income, food safety knowledge, and food safety practice were significantly associated with food safety attitude among mothers (Henok *et al*., 2024). Good knowledge of food hygiene (82%), attitude (95.2%) and practices (82.7%) were reported among nursing mothers attending under-five clinics in a rural community in Edo State, Nigeria. The predictors of hygiene, attitude and practices were education status and occupation of the mothers (Alenoghena *et al*., 2023). Mothers' knowledge, attitude and home management of diarrhoea among children under five years old in Lagos, Nigeria was assessed and about 59.2%, 55.8% and 53.1% of the respondents' knowledge, attitude and home management of diarrhea were reported. Age, occupation and level of education of the mothers were significantly associated with practice of home management of diarrhoea among children under five years old (Momoh *et al*., 2022**).**

METHODOLOGY

The study was carried out in Ijebu –Ode area of, Ogun State, Nigeria and a descriptive cross-sectional design was employed for the study. The population of the study comprised of all mothers who brought their under-five children for immunization at the selected Primary Health Centres in Ijebu-Ode at the time of data collection.

Sampling Technique

Areas in Ijebu-Ode are majorly categorized into three quarters: Iwade, Ijasi and Porogun, respectively and purposive sampling technique was used in selecting five (5) most visited Primary Health Care centers (PHC) in the three areas (Oke-Oyingbo, Iwade-Isale, Ita-Osu, Oke-Aje and Molipa). All the two hundred and five (205) mothers who brought in their children for immunization in the five PHC participated in the study.

Inclusion Criteria

i. All mothers of under-five who were resident in the study location for minimum period of three years.
ii. Mothers who gave their consent to participate in the study.
iii. Mothers who were willing and ready to give information concerning themselves and their homes.

Research Instrument

A pre-tested interviewer- administered questionnaire titled "knowledge of food borne diseases and food safety practice" KFBDFSP, which has been deployed into kobo collect software was used to gather information from

the respondents. The questionnaire was divided into three sections. Section A covered socio-demographic data of the mothers. Section B and C comprised questions on the knowledge of food borne-diseases and food safety practice among mothers of under-five children.

Validity of Research Instrument

The research instrument was validated by nutritionists, expert in food security and statisticians for contributions after which corrections were effected

Reliability of Instrument

Reliability was determined by administering the questionnaire to ten (10) mothers who were not part of the subjects. Reliability coefficient of 0.95 was obtained using Cronbach Alpha.

Method of Data Collection

Consent letters were first given to the mothers and each content of the letter was explained to them in detail. All data were collected using an electronic questionnaire on the kobo collect platform and a tablet.

Procedure for Data Analysis

Frequency distribution and percentage was used to analyse the demographic data and the research questions while student t-test and chi-square were used to test the hypotheses at 0.05 level of significance.

RESULTS AND DISCUSSION

Results: **Socio-Demographic and Socio-Economic Characteristics of the Respondents**

Table 1 shows that majority (47.3%) of the mothers were between 20-29 years of age and higher percentage of them (51.2%) attended secondary school. About 67.3% of them are traders/self-employed, and most of (80.0%) them are from nuclear family. Family household size of 2 to 4 persons (54.6%) was common amongst them. Majority (65.4%) of them practiced Christianity, parity of 1-3 (54.1%) was mostly observed among them and most (92.2%) of them were found to be married.

Table 1. Socio-demographic characteristics of respondents.

Variable	Frequency (%)
PHC	
PHC Oke-Aje	18 (8.78%)
PHC Molipa	71 (34.63%)
PHC Ita-Osu	62 (30.24%)
PHC Iwade-Isale	14 (6.83%)
PHC Oke-Oyingbo	40 (19.51%)
Age	
Below 20	13 (6.3%)
20-29	97 (47.3%)
30-39	74 (36.1%)
Above 40 years	21 (10.2%)
Level of education	
No formal education	4 (2.0%)
Primary school only	23 (11.2%)
Secondary school only	105 (51.2%)
Tertiary education	73 (35.6%)
Occupation	
Farming	5 (2.4%)
Government employed	35 (17.1%)
Trading	138 (67.3%)
Unemployed	27 (13.2%)
Family type	
Extended family	11 (5.4%)
Nuclear family	164 (80.0%)
Polygamous family	30 (14.6%)
Family size	
2-4	112 (54.6%)
5-7	86 (42.0%)
8 and above	7 (3.4%)
Religion	
Christianity	134 (65.4%)
Islam	70 (34.1%)
Others	1 (0.5%)
Number of parities	
1-3	111 (54.1%)
4-6	81 (39.5%)
7 and above	13 (6.3%)
Marital status	
Married	189 (92.2%)
Single parent	13 (6.3%)
Widowed	3 (1.5%)

Research Question One: How knowledgeable are mothers of under-five children in Ijebu-Ode about food borne-diseases?

Knowledge of Food-Borne Diseases of the Respondents

Table 2 shows that majority of the respondents gave correct responses on the meaning of food-borne diseases (91.2%), a preventable public health disease (90.7%), identifying the common types among under-five children (80.5%) and that young children can experienced death if not attended to quickly (92.7%). Most of the mothers are aware that: biological hazards (92.7%), chemical (97.1%), physical (90.7%) and exposure of baby's food can cause food borne-diseases. Mothers are also aware of the common mode of transmission of the diseases ((94.1%), and that mixing leftover food with freshly prepared food can also help in transmitting the disease (92.2%). Signs and symptoms of the diseases are also known to the mothers (95.6%). Different means of prevention of the diseases were reportedly known by the mothers: washing of hands and breast properly before feeding (95.6%), cleaning of cooking utensils and surfaces to prevent spread of the diseases (98%), freezing or refrigerating of expressed breast milk that is not for immediate consumption (74%), covering of small wound before handling baby's food (96.6%), maintaining personal hygiene (74.6%), majority of the mothers prefer the use of napkin and tissue to clean hand after changing diapers instead of using water (74.1%). Administration of Oral Rehydration Solution, ORT (81%), and continuous breast feeding were identified as home means of managing food borne-diseases among the mother.

Table 2. Table showing the respondents' responses to food-borne disease questions.

Interview question	Correct response	Incorrect responses
Meaning of food-borne disease:		
1. What is food-borne disease?	187 (91.2%)	18 (8.8%)
2. Foodborne disease is a preventable public health challenge	186 (90.7%)	19 (9.3%)
3. Which is the common food-borne disease among under 5 children	165 (80.5%)	40 (19.5%)
4. Young children are one of those that are at greater risk for experiencing a more serious illness or even death; should they get a food-borne disease	190 (92.7%)	15 (7.3%)
Causes of Foodborne diseases:		
5. Biological hazards which include bacteria, viruses, and parasite	190 (92.7%)	15 (7.3%)
6. Chemical hazards which include natural toxins and chemical contaminants	199 (97.1%)	6 (2.9%)
7. Physical hazards can include metal shavings from cans and plastic pieces or broken glass.	186 (90.7%)	19 (9.3%)
8. Exposure of baby meals without covering could lead to contamination thereby causing food borne infection	199 (97.1%)	6 (2.9%)
Means of transmission:		
9. The common mode of transmission of food borne disease	193 (94.1%)	12 (5.9%)
10. Mixing leftover food and freshly prepared food can transmit contaminate from the old meal to the new one, which can cause infection	189 (92.2%)	16 (7.8%)
Signs and symptoms:		
11. Signs and Symptoms of foodborne illness includes: nausea, diarrhoea, fever, vomiting and headache	196 (95.6%)	9 (4.4%)
Prevention of food borne diseases:		
12. Washing of hands and breast properly before breast feeding baby can help in preventing food borne diseases.	196 (95.6%)	9 (4.4%)
13. Cleaning and washing of hands and food contact surfaces and utensils often help in preventing food borne diseases.	201 (98%)	4 (2.0%)

14. Expressed breast milk that is not for immediate consumption should be stored in a refrigerator/freezer	153 (74.6%)	52 (25.4%)
15. It is important to cover small wound before handling the baby's food.	198 (96.6%)	7 (3.4%)
16. Prevention of food borne infection can be controlled through personal hygiene alone	153 (74.6%)	52 (25.4%)
17. Napkin and tissue can be used to clean hand, after changing diapers instead of washing hand with soap and water	152 (74.1%)	53 (25.9%)
Home-management of food -borne disease:		
18. Administering Oral Rehydration Solution, ORT can be used to treat food borne infection in children.	166 (81%)	39 (19%)
19. Breastfeeding a baby limits occurrence of food borne infection.	178 (86.8%)	27 (13.2%)

Table 3 below shows the knowledge of food-borne diseases among the respondents in this study. A total score of 19 is obtainable. The analysis revealed that the majority of the respondents had good knowledge of food-borne disease (89.7%). It also revealed that about (9.3%) of the respondents had fair knowledge and 1% had poor knowledge of the disease.

Table 3. Knowledge of food-borne disease of the respondents.

N=205	Good FBD knowledge ≥14.0	Fair FBD knowledge 8.0-13.9	Poor FBD knowledge 0-7.9
Total	184 (89.7%)	19 (9.3%)	2 (1%)

Correct responses were scored as '1' and wrong responses were scored as '0' A maximum score of 19 is attainable.

Research Question Two: What is the existing level of food safety practices among the mothers?

Food Safety Practice of the Respondents

Table 4 shows that the majority of the mothers wash their hands: immediately after handling raw food (93.7%), with soap and water after using the toilets (97.1%), while more than half of them follow the standard techniques of washing hands (67.8%). For food preparation, most of them: wash cooking utensils before and after use (98%), wash raw food thoroughly before cooking (97.1%), and keep raw and cooked food separately (94.1%), while 79.5% do not cook food thoroughly at the appropriate temperature.

For serving/feeding/storage of baby's food, most of the mothers do not just taste the safety of the milk, but rather check the expiry date (70.7%), 62.4% do not leave expressed breast milk and prepared baby formula at room temperature for more than 2hours before refrigerating, 67.3% of the mothers do not just clean thoroughly and give the food/snacks that has fallen on the floor back to the baby. Most of the mothers wash and air-dry cooking utensils immediately after cooking (89.9%), while 90.2% knows how to use insecticide inside the kitchen. Majority of the mothers were found to frequently: wash kitchen surface (68.3%), and dispose of kitchen waste (94.1%) and most of them-rarely: wash their cooking stove (52.2%), refrigerator (61.5%0, freezer (68.3%), and kitchen walls (57.1%).

Table 4. Food safety practices among the respondents.

Interview question	Yes		No
Hand washing:			
1. Do you wash your hands thoroughly with soap and water immediately after handling raw food?	192 (93.7%)		13 (6.3%)
2. Do you wash your hands with soap and water after using the toilet?	199 (97.1%)		6 (2.9%)
3. Do you wash your hands following the standard techniques?	139 (67.8%)		66 (32.2%)
Food preparation:			
4. Do you wash the cooking utensils before and after using?	201 (98%)		4 (2.0%)
5. Do you use stored water for cooking food?	143 (69.8%)		62 (30.2%)
6. Do you wash raw food thoroughly before cooking?	199 (97.1%)		6 (2.9%)
7. Do you cook food thoroughly at the appropriate temperature?	42 (20.5%)		163 (79.5%)
8. Do you keep raw and cooked foods separately?	193 (94.1%)		12 (5.9%)
9. Do you taste prepared food to check whether they are safe or not before feeding baby?	189 (92.2%)		16 (7.8%)
10. Do you use pipe-borne water to cook rather than water from water tankers?	165 (80.5%)		40 (19.5%)
11. Do you use separate cooking utensils to prepare baby's food?	178 (86.8%)		27 (13.2%)
Serving/feeding baby/ storage:			
12. Do you wash your hands with soap and water and rinse your breast very well before feeding?	182 (88.8%)		23 (11.2%)
13. Do you taste the safety of the milk instead of checking the expiry date?	60 (29.3%)		145 (70.7%)
14. Do you leave expressed breast milk and prepared baby formula at room temperature for more than 2hours before refrigerating?	77 (37.6%)		128 (62.4%)
15. Do you clean thoroughly and give the food/snacks that has fallen on the floor back to the baby?	67 (32.7%)		138 (67.3%)
16. Do you discard or refrigerate leftover food immediately?	160 (78%)		45 (22%)
Cleaning:			
17. Do you wash and air-dry cooking utensils immediately after cooking?	184 (89.9%)		21 (10.2%)
18. Do you keep utensils in a clean, closed isolated place?	182 (88.8%)		23 (11.2%)
19. How do you use insecticide inside the kitchen? (a). Getting all the utensils out of the kitchen first. (b).covering utensils with cloth before applying the insecticides. (c)Applying the insecticides directly and cleaning utensils after	185 (90.2%)		20 (9.8%)
	Frequently	**Never**	**Rarely**
20. How often do you wash the cooking stove?	92 (44.9%)	6 (2.9%)	107 (52.2%)
21. How often do you wash the refrigerator?	73 (35.6%)	6 (2.9%)	126 (61.5%)

22. How often do you wash the freezer?	57 (27.8%)	8 (3.9%)	140 (68.3%)
23. How often do you wash the kitchen surface?	140 (68.3%)	2 (1.0%)	63 (30.7%)
24. How often do you wash the kitchen walls?	56 (27.3%)	32 (15.6%)	117 (57.1%)
25. How often do you dispose of the kitchen waste?	193 (94.1%)	2 (1.0%)	10 (4.9%)

Correct responses were scored as '1' and wrong responses were scored as '0' A maximum score of 32 is attainable.

Table 5 shows the level of food safety practice among the respondents in this study. A total score of 32 is obtainable. The analysis revealed that most of the respondents had good food safety practices (74.1%). It also revealed that about (25.9%) of the respondents had fair food safety practices while 0% had poor food safety practices in this study.

Table 5. Food safety practices of the respondents.

N=205	Good Food Safety Practices 23-32	Fair Food Safety Practice 12-22	Poor food safety practice 0-11
Total	152 (74.1%)	53 (25.9%)	0 (0%)

Hypotheses

H_{01}: There is no significant difference between knowledge of food-borne diseases and practice of food safety among the respondents.

T-test was performed to examine the differences between the respondent's knowledge of food-borne diseases and food safety practices. The result showed that there is a significant difference between the knowledge of food-borne diseases and food safety practices of the respondents (p-value = 0.000). This was presented in table 6.

H_{02}: There is no significant difference between the practice of food safety and the socio-demographic factors of the respondents. Table 7 shows that age, level of education, and marital status were found to be significantly associated with the food safety practices of the mothers.

Table 6. Knowledge of food-borne diseases and practice of food safety.

Variables	t	df	P-value
Knowledge of food-borne diseases and food safety practices	4.166	204	0.000

Table 7. Practice of food safety and socio-demographic factors.

	Category	**Food safety practice**			**Chi-Square (p-value)**
		Good	**Fair**	**Poor**	
Age	Below 20	8	5	0	0.026*
	20-29	75	22	0	
	30-39	56	18	0	
	Above 40 years	16	5	0	
Educational level	No formal education	3	1	0	
	Primary school only	11	12	0	
	Secondary school only	76	29	0	0.005*
	Tertiary education	62	11	0	
Occupation	Farming	3	2	0	
	Government employed	28	7	0	0.750
	Trading/self-employed	101	37	0	
	Unemployed	20	7	0	
Family type	Extended family	6	5	0	0.301
	Nuclear family	124	40	0	
	Polygamous family	22	8	0	
Family size	2-4	84	28	0	0.949
	5-7	63	23	0	
	8 and above	5	2	0	
Religion	Christianity	99	35	0	0.277
	Islam	53	17	0	
	Others	0	1	0	
Number of parities	1-3	81	30	0	0.910
	4-6	61	20	0	
	7 and above	10	3	0	
Marital status	Married	145	44	0	0.014*
	Single parent	6	7	0	
	Widowed	1	2	0	

DISCUSSION

Majority of the participants were between 20-29 years of age (47.3%) which is within the recommended average reproductive age of women globally; which is from 15-49 years (Akpojene *et al*., 2019). The reports of the participants' educational level, occupation and household size were against the study of Achiro *et al*., 2023 who reported the educational level of children's caregivers to be primary education (55,7%), major occupation to be farming (75%) and household size to be lesser than 7 (53.5%). This study found out that mothers possessed good knowledge of food borne diseases and good practise of food safety. Alenoghena *et al*., (2023) also reported good knowledge of food hygiene (82%) and good practise among nursing mothers attending the under-five clinic in health care facilities in Edo state Nigeria. Meanwhile, as opposed to the result of this study, a study of mothers' knowledge, attitude, and home management of diarrhoea among children under-five years old in Lagos reported that 59.2% of the respondents had good knowledge, 55.8% of them had positive attitude, and 53.1% of them had good practice towards prevention and home management of diarrhoea (Momoh *et al*., 2022).

Alenoghena *et al*., (2023), reported the predictors of knowledge, attitude and practice of food hygiene among nursing mothers attending the under-five clinic in health care facilities in Edo state Nigeria to be educational status and occupation of the mothers as supported by this present study.

CONCLUSION

In conclusion, the study shows that the knowledge of food-borne diseases and practices of food safety among mothers of under-five children attending immunization at Primary Health Centers in the study area was good. A relationship between knowledge of food-borne diseases and practice of food safety was established. Age, level of education, and marital status were found to be significant determinants of food safety practice among the mothers. It was thus recommended that seminars and training on the cleaning of kitchen and kitchen utensils should be regularly conducted in the study area as these were found to be rarely performed by the under-five mothers in the study area.

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