

ATTITUDES OF IRAQI MOTHERS REGARDING FOOD POISONING: A CROSS  
SECTIONAL STUDY IN BAGHDADHeba Baqer Abdulrazzaq Al-Haddad<sup>1\*</sup>, Shaymaa Hazim Mahmood Al-Bakri<sup>1</sup>, Shatha Hassan Ali<sup>1</sup><sup>1</sup>Al-Karkh Health Directorate.

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\*Corresponding Author: Heba Baqer Abdulrazzaq Al-Haddad

Al-Karkh Health Directorate.

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## ABSTRACT

**Background:** Mothers are primary food handlers in Iraqi households and play a critical role in preventing food poisoning among family members, yet their attitudes toward food safety are not well characterized in Baghdad. **Aim of study:** To assess attitudes of mothers attending primary health care centers in Baghdad regarding food poisoning and to identify sociodemographic factors associated with these attitudes. **Patients and methods:** This cross-sectional study included 200 mothers aged  $\geq 18$  years attending primary health care centers in Medical City, Baghdad, between January and May 2026. Data were collected using a structured questionnaire adapted from Shati et al., comprising sociodemographic variables and 14 attitude items scored on a three-point scale and categorized as good ( $\geq 60\%$ ) or poor ( $< 60\%$ ) attitude. **Results:** Overall, 60% of mothers had a good attitude toward food poisoning prevention, while 40% had a poor attitude. Urban residence, higher educational level, employment, and lower frequency of eating outside the home were significantly associated with good attitude scores, whereas age, marital status, family size, family history of food poisoning, and the family member responsible for cooking showed no significant associations. **Conclusion:** This cross-sectional study of mothers attending primary health care centers in Baghdad found that only 60% had a good attitude toward food poisoning prevention, while 40% had poor attitudes. Urban residence, higher education, employment, and lower frequency of eating outside were associated with more favorable attitudes, indicating the need for targeted food safety education for rural, less educated, and unemployed mothers.

## INTRODUCTION

Food poisoning is characterized as a range of symptoms resulting from the ingestion of contaminated food or water, caused by various pathogens including bacteria, viruses, and parasites, poisonous chemicals, radioactive substances and other harmful substances leading to more than 250 different food-borne diseases (ranging from diarrhea to cancers).<sup>[1]</sup> A secure food supply is crucial due to the considerable illness load and the economic impact on society and the country.<sup>[2]</sup> Preventing food poisoning necessitates the implementation of food hygiene and safety as essential elements, alongside educating customers about their selection of eating establishments.<sup>[3],[4]</sup>

Symptoms of toxigenic food poisoning often manifest within 24 hours after the consumption of contaminated food, while foodborne illnesses may not present until 2-3

days later. The predominant symptoms are nausea, vomiting, diarrhea, abdominal discomfort, fever, and headache. Severe neurologic, hepatic, and renal syndromes might manifest many days post-intestinal symptoms and may result in lifelong impairment or mortality, contingent upon the ingested bacterium.<sup>[5]</sup>

The World Health Organization (WHO) reports that contaminated food causes 1.5 billion instances of diarrhea in children annually, leading to almost three million premature fatalities. Safe food is characterized by its inability to cause injury or sickness to the consumer. Food safety encompasses the procedures for handling, preparing, and storing food to avoid contamination by harmful chemicals or pathogenic microorganisms, hence preventing foodborne illnesses.<sup>[6]</sup>

Studying mothers' attitudes toward food poisoning is essential because they are typically the primary food handlers at home and thus constitute the last line of defense against foodborne illness in children. Attitudes strongly influence whether knowledge is translated into hygienic behaviors such as appropriate storage, cooking, reheating, and avoidance of cross-contamination, which are central to preventing food poisoning. Evidence from parental and maternal KAP studies shows positive correlations between knowledge, attitude, and practice scores, and indicates that more favorable attitudes are associated with safer household food-handling behaviors and higher overall hygienic practice scores. Moreover, attitudes and related practices are shaped by socio-demographic factors such as education and income, so assessing mothers' attitudes helps identify high-risk subgroups and tailor health education programs and community interventions to effectively reduce household foodborne disease burden.<sup>[7]</sup>

This study was conducted to assess the attitudes of mothers attending primary health care centers regarding food poisoning and to evaluate the sociodemographic characteristics associated with attitudes.

## METHODOLOGY

### Study setting

This cross sectional study was conducted in Al-Yarmouk Teaching Hospital and Al-Karkh Hospital/ Baghdad/ Iraq. Data collection was complete within 5 months, i.e., from January 2026 to May 2026.

All adult mothers ( $\geq 18$  years old) who consented to participate in the study were included. Exclusion criteria were mothers with dementia, mental illness, retardation... etc.

### Ethical consideration

Written consent was obtained from all participants before data collection.

### Data collection

A questionnaire-based patient interview was employed as the data collection method. Questionnaire form: The first part collected demographic information (mother's age, marital status, educational level and occupations, residency and number of family members), as well as (past medical history regarding food poisoning), and the frequency of outdoor meals. The second part consisted of 14 questions evaluating the attitudes of mothers. The attitude questionnaire was adopted from a study by (Shati *et al.*, 2021).<sup>[8]</sup> Each item on the questionnaire utilized a three-point response scale, where correct, neutral, and incorrect answers were assigned scores of 2, 1, and 0, respectively, culminating in a maximum cumulative score of 28. To facilitate categorical analysis, participant attitudes were stratified based on a 60% threshold, wherein scores equal to or exceeding 60%

were classified as "good," while scores falling below 60% were designated as "poor."

### Data entry and analysis

Data entry was done using Microsoft Excel 2019. Data was recorded into different quantitative and qualitative variables for the purpose of analysis. Analysis was done using statistical package for social sciences (SPSS version 26). Data was summarized using measures of frequency (mean, median, mode), dispersion (standard deviation), tables and graphs. Fischer's exact test was used to test for the association between categorical variables. A two-tailed P value of less than or equal to 0.05 was assigned as a criterion for declaring statistical significance.

## RESULTS

A total number of 200 mothers were included in the study sample. The study sample included 200 participants with a slight predominance of individuals aged  $< 40$  years (52.5%) compared to those aged  $\geq 40$  years (47.5%). Most participants were married (83.0%), while divorced and widowed individuals constituted 10.5% and 6.5%, respectively. Residence was nearly equally distributed between rural (50.5%) and urban (49.5%) areas. The majority of families comprised 4–6 members (51.1%), followed by 2–3 members (37.2%) and  $> 6$  members (11.7%). More than half of the mothers had higher education (53.0%), while 27.5% and 19.5% had secondary and primary education, respectively. Employed mothers represented 55.5% of the sample, compared to 44.5% who were unemployed. In most households, the mother was responsible for cooking (71.0%), whereas this role was shared (11.0%), assigned to others (15.5%), or to the father alone (2.5%). A high proportion of participants reported a family history of food poisoning (85.5%), compared to 14.5% without such history. Regarding outdoor meal frequency, 33.5% reported eating outside 1–2 times per week, 30.0% 1–3 times per month, 23.5%  $\geq 3$  times per week, and 13.0% reported never eating outside.

**Table 1: Basic characteristics of the studied sample.**

Variable	Frequency	Percentage
<b>Age</b>		
<40	105	52.5
≥ 40	95	47.5
<b>Marital status</b>		
Married	166	83.0
Divorced	21	10.5
Widow	13	6.5
<b>Residence</b>		
Rural	101	50.5
Urban	99	49.5
<b>Number of family members</b>		
2-3 persons	102	37.2
4-6 persons	140	51.1
>6 persons	32	11.7
<b>Mother's educational level</b>		
Primary education	39	19.5
Secondary education	55	27.5
Higher education	106	53.0
<b>Mother's occupational status</b>		
Employed	111	55.5
Unemployed	89	44.5
<b>Family member responsible for cooking at home</b>		
Mother	142	71.0
Father	5	2.5
Both	22	11.0
Others	31	15.5
<b>Family history of food poisoning</b>		
Yes	171	85.5
No	29	14.5
<b>Frequency of outdoor meals</b>		
Never	26	13.0
1-3 per month	60	30.0
1-2 per week	67	33.5
≥ 3 per week	47	23.5

**Answers to the attitude questionnaire**

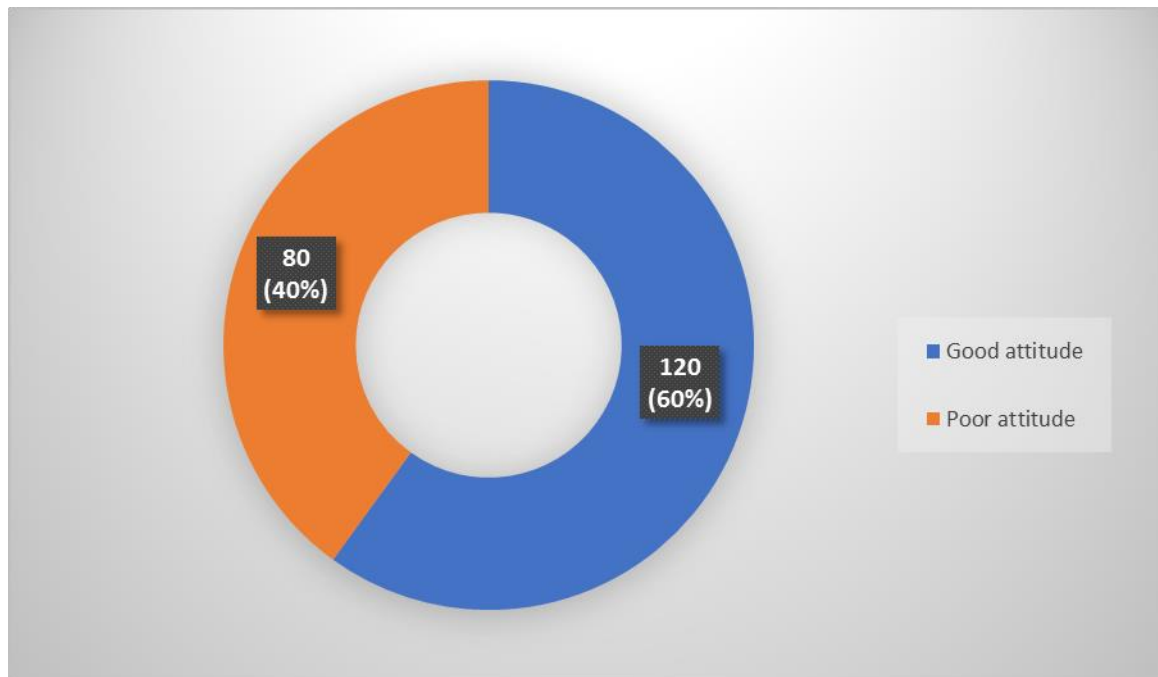
The attitude assessment demonstrates generally favorable awareness toward major food safety practices, with particularly strong positive attitudes observed for hand hygiene and food washing, as 98.0% and 97.0% agreed on the necessity of handwashing before eating and food preparation, respectively, and 93.0% supported washing fruits and vegetables. Additionally, a high proportion (82.0%) correctly acknowledged that asymptomatic food handlers can transmit pathogens. Misconceptions were minimal regarding raw animal products, with the majority disagreeing that raw eggs (82.5%), raw milk (67.5%), and raw meat (88.5%) are safe or risk-free, indicating good baseline knowledge in this domain. However, several weaker areas were identified, notably the relatively high proportion of participants expressing unsafe attitudes toward food handling practices, including 40.5% agreeing that wiping fruits and vegetables is sufficient for safety, 30.0% believing that baby feces are non-pathogenic, and 25.5% considering cooked food left at room temperature for one day safe if

covered. Furthermore, 22.5% and 15.0% of participants perceived raw milk as healthy and risk-free, respectively, reflecting persistent misconceptions; as shown in Table (2).

**Table 2: Distribution of the studied sample according to their attitude.**

Question	Disagree, frequency (%)	Not sure, frequency (%)	Agree, frequency (%)
Raw eggs are more healthy than cooked ones	165	9	26
	82.5%	4.5%	13.0%
There is no risk of disease from eating raw eggs?	167	13	20
	83.5%	6.5%	10.0%
Raw milk is more healthy and nutritious than pasteurized or boiled milk	135	20	45
	67.5%	10.0%	22.5%
There is no risk of disease from drinking raw milk	149	21	30
	74.5%	10.5%	15.0%
There is no risk of disease from eating raw meat	177	8	15
	88.5%	4.0%	7.5%
Wiping vegetables or fruits make them safe for eating	101	18	81
	50.5%	9.0%	40.5%
Baby feces is free from pathogenic microbes if he/she is not sick	107	33	60
	53.5%	16.5%	30.0%
There is no risk of disease from eating cooked food kept at room temperature for one day if covered	130	19	51
	65.0%	9.5%	25.5%
There is no risk of disease from eating unwashed vegetables picked up directly from the plant	149	23	28
	74.5%	11.5%	14.0%
Food handlers without clinical symptoms , can contaminate food with pathogenic microbes which cause food poisoning	15	21	164
	7.5%	10.5%	82.0%
Rain water collected in reservoir is safe to drink without any treatment	152	23	25
	76.0%	11.5%	12.5%
Washing of vegetables and fruits is necessary to prevent food poisoning	10	4	186
	5.0%	2.0%	93.0%
Washing hands with soap and water before eating food is necessary to prevent food poisoning	2	2	196
	1.0%	1.0%	98.0%
Washing hands with soap and water before preparing food is necessary to prevent food poisoning	4	2	194
	2.0%	1.0%	97.0%

Regarding attitude rating, 120 (60%) women had good attitude, whereas 80 (40.0%) (22.6%) had poor attitude; as illustrated in figure (1).



**Figure (1): Attitude rating of the studied sample.**

The analysis demonstrates that attitude scores were not significantly associated with age (p=0.470) or marital status (p=0.917), as comparable distributions of good and poor attitudes were observed across categories. Similarly, no significant association was found with family size (p=0.080) or family history of food poisoning (p=0.413). In contrast, residence showed a statistically significant association (p=0.021), with urban participants exhibiting a higher proportion of good attitudes (48.5%)

compared to rural participants (31.7%). Maternal education level was strongly associated with attitude (p=0.003), as the proportion of good attitudes increased markedly with higher education (70.8% among higher education vs. 43.6% in primary education). Likewise, maternal employment status demonstrated a significant relationship (p=0.001), with employed mothers more likely to have good attitudes (70.3%) compared to unemployed mothers (47.2%); as shown in Table (3).

**Table (3): Association between attitude score and basic characteristics of the studied sample.**

Parameter	Attitude		P value
	Good (N=120)	Poor (N=80)	
<b>Age</b>			
<40	45	60	<b>0.470</b>
	42.9%	57.1%	
≥40	35	60	
	36.8%	63.2%	
<b>Marital status</b>			
Married	66	100	<b>0.917</b>
	39.8%	60.2%	
Divorced	8	13	
	38.1%	61.9%	
Widow	6	7	
	46.2%	53.8%	
<b>Residence</b>			
Rural	32	69	<b>0.021</b>
	31.7%	68.3%	
Urban	48	51	
	48.5%	51.5%	
<b>Number of family members</b>			
2-3 persons	19	46	<b>0.080</b>
	29.2%	70.8%	
4-6 persons	37	42	
	46.8%	53.2%	
>6 persons	24	32	
	42.9%	57.1%	
<b>Educational level</b>			
Primary education	17	22	<b>0.003</b>
	43.6%	56.4%	
Secondary education	28	27	
	50.9%	49.1%	
Higher education	75	31	
	70.8%	29.2%	
<b>Occupational status</b>			
Employed	78	33	<b>0.001</b>
	70.3%	29.7%	
Unemployed	42	47	
	47.2%	52.8%	
<b>Family member responsible for cooking at home</b>			
Mother	83	59	<b>0.209</b>
	58.5%	41.5%	
Father	4	1	
	80.0%	20.0%	
Both	17	5	
	77.3%	22.7%	
Others	16	15	
	51.6%	48.4%	

Family history of food poisoning			
Yes	105	66	0.413
	61.4%	38.6%	
No	15	14	
	51.7%	48.3%	
Frequency of outdoor meals			
Never	23	3	<0.001
	88.5%	11.5%	
1-3 per month	42	18	
	70.0%	30.0%	
1-2 per week	36	31	
	53.7%	46.3%	
≥ 3 per week	19	28	
	40.4%	59.6%	

**DISCUSSION**

In the developing world, women mostly bear the burden for food preparation and family care, including household cleaning, organization, and meal preparation for all family members. Furthermore, the female assumes the role of a mother, attending to her children. This is evident in the research, which indicates that women are primarily responsible for food preparation. Given their additional household responsibilities, there may be deficiencies in adhering to essential food safety procedures.<sup>[6]</sup>

The present study showed that only 60% had good attitude, whereas 40% had poor attitudes. The study by Shati et al. who revealed that 60% had poor attitude.<sup>[8]</sup> In Palestine, Zyoud et al. obtained better results as the mean attitude score was 11.1 out of 15.<sup>[9]</sup>

In this study, notable weak areas identified include: 40.5% of participants believing that wiping fruits and vegetables ensures safety, 30.0% considering baby feces non-pathogenic, and 25.5% viewing cooked food covered and left at room temperature for one day as safe. Many caregivers did not recognize raw fruits and vegetables as potential vehicles for germs that can cause illness, and a substantial proportion believed that fresh produce was “not likely” to carry pathogens that could make them sick, indicating underestimation of risk from inadequately washed produce. In the United States, the study by Lum et al. reported that many caregivers did not recognize raw fruits and vegetables as potential vehicles for germs that can cause illness, and a substantial proportion believed that fresh produce was “not likely” to carry pathogens that could make them sick, indicating underestimation of risk from inadequately washed produce.<sup>[10]</sup> Zyoud et al. reported that in Palestine, around two-thirds wrongly agreed that baby feces are free from pathogenic microbes if the infant is not sick, indicating a widespread belief that infant stools are harmless.<sup>[9]</sup>

The present study demonstrated that both educational attainment and employment status were significantly associated with maternal attitudes regarding food poisoning, with employed mothers and those possessing

higher levels of education exhibiting more favorable attitudes. Mekonnen et al. reported that higher educational level, being employed, and urban residence were significantly associated with higher knowledge scores and improved attitudes toward prevention of food poisoning among parents.<sup>[6]</sup> In a systematic review of knowledge, attitude, and practice regarding food poisoning prevention, several included studies showed a positive association between socio-demographic profile (including education, income, work experience, and training) and higher KAP levels, including more positive attitudes toward food safety and food poisoning prevention.<sup>[11]</sup>

The current study also found that increased frequency of outdoor meals was associated with lower attitude scores regarding food poisoning. This is in concordance with Zyoud et al. who reported that Reported that parents who ate more than two meals per week away from home had lower median attitude scores toward food poisoning prevention (10.5) compared with those who rarely or occasionally ate outside (medians 11–12), suggesting more frequent dining out is associated with less favorable attitudes.<sup>[9]</sup>

Public health agencies emphasize that outdoor eating (picnics, barbecues, camping) increases food poisoning risk because of temperature control problems, inadequate hand-washing facilities, and environmental contamination; they highlight that many consumers underestimate these risks and therefore do not adopt appropriate preventive behaviors when eating outdoors.<sup>[12]</sup>

**CONCLUSION**

This cross-sectional study of mothers attending primary health care centers in Baghdad found that only 60% had a good attitude toward food poisoning prevention, while 40% had poor attitudes. Urban residence, higher education, employment, and lower frequency of eating outside were associated with more favorable attitudes, indicating the need for targeted food safety education for rural, less educated, and unemployed mothers.

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