Assessment of Food Safety Knowledge and practice and Factors that may affect them among the General Population at Family Medicine Outpatient clinic

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Abstract

Introduction: Foodborne diseases are considered a major health problem worldwide; knowledge and practice of consumers' adherence to food safety practices will help them to take preventive cautions to protect themselves from the risks of foodborne illnesses.

Methods: This study was a descriptive cross-sectional study that aimed to assess the knowledge and practice of food safety awareness among Egyptian healthy adults attending family medicine outpatient clinics, Cairo University. The study involved 305 participants. Food safety knowledge and practice were evaluated by Food Safety reliable and valid questionnaire.

Results: Only (0.3%) of participants had sufficient knowledge and (19.3%) had sufficient practice. There was a statistically significant difference between the studied participants regarding practice grade and education with (78%) of participants with sufficient practice being moderately or highly educated.

Conclusion: We concluded from this study that the general community has insufficient food safety knowledge and practices; as a result, it is required to hold training programs in the form of workshops or to incorporate courses in the Ministry of Health's curriculum .

Key Words: food safety, knowledge, practice

Introduction

Foodborne disease is any disease caused by eaten food. Ingestion of sufficient quantity is the primary cause in producing such diseases [1]. Developing countries are much more affected by foodborne diseases due to food safety training negligence, insufficient hygiene practices and unhygienic storage [2]. According to the World Health Organization (WHO), roughly 2 million foodborne illnesses occur each year worldwide, primarily in impoverished nations [3]. So, foodborne diseases are considered a major health problem and therefore food safety is a global health goal [4].

Food safety is defined as the degree of certainty that food will not cause illness or harm to the customer when cooked, served, and consumed as advised [5].

Although food producers, manufacturers, and traders are the main parties responsible for ensuring food safety, knowledge and practice of consumers adherence to food safety practices, will help them take preventive caution to protect themselves from foodborne disease hazards [6]. Disease-causing microbes, viruses, parasites, and other food-borne organisms proliferate and are spread as a result of unsanitary food preparation, transport, and preservation [7]. In the house, there are no rules for food preparation, handling, or storage. International studies have demonstrated that during domestic food preparation, consumers often implement unsafe behaviors with food handling, thereby such malpractices may increase the risk and incidence of food poisoning [2].

Consumer education is the only way used to maintain food safety at home. Previous study [8] has indicated the necessity for ongoing initiatives to educate consumers about the dangers of inappropriate food handling.

Method

Type of study: This is a descriptive Cross-sectional study, done in the family medicine outpatient clinic at Cairo University.

Ethical considerations: Approval was obtained from the ethical committee in Cairo University number MS-128-2021.

Sample Size and Participants: Patients attending Kasr Alainy Outpatient Family Medicine Clinics for any medical reason and who were more involved in food preparation, of both sexes, were invited to participate in the study. Based on the previous study of El Sakhy et al. in 2020 [4] at which poor knowledge was reported in 40%, and the rate of population of the selected age group at the clinic was 1500 in the last 3 months, the minimal required sample size was calculated to be 300 by using open epi6 program with confidence interval 90% and power 80%.

Inclusion and exclusion criteria: All adults of both sexes aged 18-65 years and involved in food preparation, were included in this study, while adult patients who had any cognitive or psychological problems were excluded.

The study tools: The study was conducted from February 2021 to October 2021. Food safety knowledge and practice was evaluated by Food Safety reliable, and valid questionnaire which was developed by Byrd-Bredbenner, et al (2007) [9]. The questionnaire was designed in English language so; a back-to-back translation into Arabic was conducted via Cairo University Center for Foreign Languages and Translation Specialist.

Study design: This study was conducted on 305 adults of both sexes aged 18-65 years, involved in food preparation, attending Kasr Alainy Outpatient Family Medicine Clinics, who were invited to participate in the study. Participants completed the following package: Firstly, written informed consent was taken after explaining the steps of the study, and then the researcher took detailed history to exclude any medical problem which may interfere with the study, finally fulfilling the food safety questionnaire to evaluate the food safety knowledge and practice.

The questionnaire consisted of three parts:

1. Demographic characteristics
2. Food-handling practices, which is subdivided into: food bacteriology practices, food cooking and preparation processes, storage of food and sanitizing practices.
3- Food safety knowledge, which is organized into three categories: preparation of food, storage of food, and sanitizing knowledge.

Statistical analysis of data:

The data was coded, entered, displayed, and analyzed by computer using the Statistical Package for Social Science (SPSS) version 26 data base software application. The Chi square (X2) test was used to find a relationship between distinct qualitative variables. Qualitative data were expressed as frequencies and percent .

For quantitative variables, mean and standard deviation (SD) were calculated, and an independent t-test (t) was performed to find differences between them . When the significant probability (P value) was < 0.05 and <0.001, the results were declared statistically significant and very statistically significant, respectively.

Result

As illustrated in Table (1), the majority of participants were females (85.9%). The high education constitutes only (11.8%) of the participants. The distribution of age groups was nearly equal. The majority live with their families (94.1%).

Table (2) shows that, regarding Frequency of meals consumed away from home where (81.6%) of participants almost always consume meals away from home. Regarding personal food poisoning, only (11.8%) experienced food poisoning. The main source of food health advice was from family and friends in (66.9%) of cases.

Table (3A) shows that, regarding food handling practice about (21.3%) know that after using a chopping board to slice uncooked meat or chicken and needing to slash tomatoes, they should clean it with soap and wash it under

heated water, and (13.8 percent) knows that if they have a wound on the back of their hand, they should gauze pad the wound and wear a glove when preparing food for others.

About (10.2%) of the studied participants know that a hamburger is properly cooked if it has the correct food thermometer reading. About (27.5%) of participants are aware that putting cold ice cream in their basket should be done at the end of the shopping excursion.

Table (3B) shows that; (36.1%) of the studied participants knows that they should defrost frozen meat in the refrigerator and (20.0%) knows that in case of the power being turned off any beef, chicken, or fish in their freezer that has melted and feels warm, should be thrown away.
Table (4A) shows that (14.1%) of the studied participants are aware that Staphylococcus bacteria can cause food poisoning, and (5.9%) knows that that Campylobacter germs are most commonly found in uncooked poultry. About (6.9%) of the participants in the study are aware that if they don't wash their hands after handling raw chicken, they increase the risk of contaminating the next meal they touch, with Salmonella germs.

About (10.8%) percent of the participants in the study are aware that all meals are harmless when prepared to a temperature level of 74 degrees.

Table (4B) demonstrates that (3.9%) of the participants in the study are aware that the average temperature in freezers should be 4 degrees Celsius to ensure food safety .

About (11.1%) of the participants in the study are aware that kitchen countertops should be cleansed, disinfected, and sterilized after all of these activities. (If the counter is in continual use, clean it after use, whenever you start working with another sort of food, and at 4-hour intervals).

As illustrated in Table (5) and Figure (1) only (0.3%) had sufficient knowledge and (19.3%) had sufficient practice.
As illustrated in Table (6) and Figure (2) there was a statistically significant difference between the studied participants regarding practice grade and education with (78%) of participants with sufficient practice who were moderate or highly educated.

Table 1: Sociodemographic characteristics of the studied group (n=305)

Variables		Study group (N=305)	
		N	%
Gender	Male	43	14.1
	Female	262	85.9
Education	Primary or less than primary education	127	41.6
	Secondary education	142	46.6
	Higher education	36	11.8
Age group	20-25	53	17.4
	26-30	50	16.4
	31-35	69	22.6
	36-40	61	20.0
	≥41	72	23.6
Residential status	Family	287	94.1
	Alone	14	4.6
	Dormitories	4	1.3

Table 2: Personal food habits in the studied group (n=305)

Variables		Study group (N=305)	
		N	%
Purchases for household consumption at home	Yes	286	93.8
	No	19	6.2
Personal cooking habit Meals eaten outside home on a regular basis	Yes, almost, always	249	81.6
	Sometimes	56	18.4
Frequency of meals eaten outside	Never	50	16.4
	1-3 times/month	68	22.3
	1-2 times/week	68	22.3
	>2 times/week	60	19.7
	Everyday	59	19.3
Exposure to food poisoning:	Yes	36	11.8
	No	269	88.2
Main source of customer and food healthy advice from:	Family/friends	204	66.9
	Personal doctor	7	2.3
	Mass media	45	14.8
	Internet	41	13.4
	Other	8	2.6

Table 3A: Food handling practice among the studied group

Questions	Response	Study group (N=305)	
		N	%
(1) After slicing fresh meat on a chopping board	Soap the chopping board and run it under heated water to clean it [Proper Practice]	65	21.3
	[Improper Practice]	240	78.7
(2) When you need to re-use the knife after cutting raw flesh	Using detergent and heated water [Proper Practice]	78	25.6
	[Improper Practice]	227	74.4
(3) Raw meat stored in	Lowest shelf [Proper Practice]	43	14.1
	[Improper Practice]	262	85.9
(4) If you have a wounded hand, do you cook food for others?	Yes, when I wrap the wound in gauze and use a glove [Proper Practice].	42	13.8
	[Improper Practice]	263	86.2
(5) How do you check that a hamburger is sufficiently cooked?	When it has reached the desired temperature on the monitor [Proper Practice]	31	10.2
	[Improper Practice]	274	89.8
(6) Time needed to reheat leftover foods	Till the water boils [Proper Practice]	106	34.8
	[Improper Practice]	199	65.2
(7) How do you know whether the chickens are fully cooked?	When the meat has reached the desired temperature on the monitor [Proper Practice]	29	9.5
	[Improper Practice]	276	90.5
(8) When do you add frozen ice cream to your shopping basket?	Just before finishing off, at the end of the shopping excursion [Proper Practice]	84	27.5
	[Improper Practice]	221	72.5

Table 3B: Food handling practice among the studied group

Questions	Response	Studied group (N=305)	
		N	%
(9) Defrost frozen meat	In the refrigerator [Proper Practice]	110	36.1
	[Improper Practice]	195	63.9
(10) Do you have a thermometer in your refrigerator?	Yes [Proper Practice]	96	31.5
	[Improper Practice]	209	68.5
(11) If the power is turned off and the beef, chicken, or fish in your fridge is melted and becomes warm,	Throw them away [Proper Practice]	61	20.0
	[Improper Practice]	244	80.0
(12) Is there a way to keep the meal fresh until the individual is ready to consume it?	Keep it in the fridge and reheat if needed [Proper Practice]	123	40.3
	[Improper Practice]	182	59.7
(13) Before you begin making meals, wash your hands by	Water and regular soap [Proper Practice]	119	39.0
	[Improper Practice]	186	61.0
(14) How frequently do you clean your kitchen faucet?	Daily [Proper Practice]	119	39.0
	[Improper Practice]	186	61.0
(15) You rinse vegetables and fruit using	Cold running water [Proper Practice]	209	68.5
	[Improper Practice]	96	31.5
(16) You wash your hands after handling food while touching	Touching Face [Proper Practice]	55	18.0
	[Improper Practice]	250	82.0

Table 4A: Food safety knowledge among the studied group

Questions	Response	Studied group (N=305)	
		N	%
(17) Staphylococcus bacteria are associated with	Cooks who create food with their bare hands and just let it cool at room temperature. [Proper Knowledge]	43	14.1
	[Improper Knowledge]	262	85.9
(18) Which food is most often related with Campylobacter bacteria?	Poultry that is raw or undercooked [Proper Knowledge]	18	5.9
	[Improper Knowledge]	287	94.1
(19) Risk of polluting the next food with Salmonella bacteria, if you don't wash your hands after handling?	Uncooked poultry [Proper Knowledge]	21	6.9
	[Improper Knowledge]	284	93.1
(20) Listeria bacteria are most linked to	Deli meats [Proper Knowledge]	22	7.2
	[Improper Knowledge]	283	92.8
(21) At which temperature meals are considered safe?	74 c [Proper Knowledge]	33	10.8
	[Improper Knowledge]	272	89.2
(22) How can foodstuff be protected if it harbors Salmonella?	It should be cooked properly [Proper Knowledge]	47	15.4
	[Improper Knowledge]	258	84.6
(23) What consistency should omelettes have in order to feel safe to eat?	Albumen and yolk are solids [Proper Knowledge]	109	35.7
	[Improper Knowledge]	196	64.3
(24) Food that is lowest prone to induce food illness	Chocolate cake [Proper Knowledge]	56	18.4
	[Improper Knowledge]	249	81.6

Table 4B: Food safety knowledge among the studied group

Questions	Response	Study group (N=305)	
		N	%
(25) Fridges should be kept at an optimum temperature of?	4 c [Proper Knowledge]	12	3.9
	[Improper Knowledge]	293	96.1
(26) Food can be frozen to kill hazardous microorganisms?	False [Proper Knowledge]	97	31.8
	[Improper Knowledge]	208	68.2
(27) The riskiest way to defrost a freezer roast is?	Place it on the kitchen counter to defrost. [Proper Knowledge]	38	12.5
	[Improper Knowledge]	267	87.5
(28) When keeping raw beef, fish, or poultry in the fridge?	All precautions should be taken. [Proper Knowledge]	38	12.5
	[Improper Knowledge]	267	87.5
(29) The most crucial method for avoiding food contamination	Keep items frozen till ready to serve or cool. [Proper Knowledge]	52	17.0
	[Improper Knowledge]	253	83.0
(30) In order to avoid food contamination,	1 or 3 [Proper Knowledge]	31	10.2
	[Improper Knowledge]	274	89.8
(31) What is the most effective way to avoid food contamination in the kitchen?	Wipe with a sanitizing solution after washing with a detergent and rinsing. [Proper Knowledge]	34	11.1
	[Improper Knowledge]	271	88.9
(32) Kitchen countertops should be cleaned, disinfected, and sterilized.	All of the choices [Proper Knowledge]	52	17.0
	[Improper Knowledge]	253	83.0

Table 5: Practice and knowledge among the studied group

Variables		Studied group (N=305)	
		N	%
Practice score	Mean	4.49 ±3.14	
	Range	0-13	
Knowledge score	Mean	2.3 ±1.54	
	Range	0-8	
Practice grade	Sufficient	59	19.3
	Insufficient	246	80.7
Knowledge grade	Sufficient	1	0.3
	Insufficient	304	99.7

Figure 1: Practice and knowledge degree among the studied group

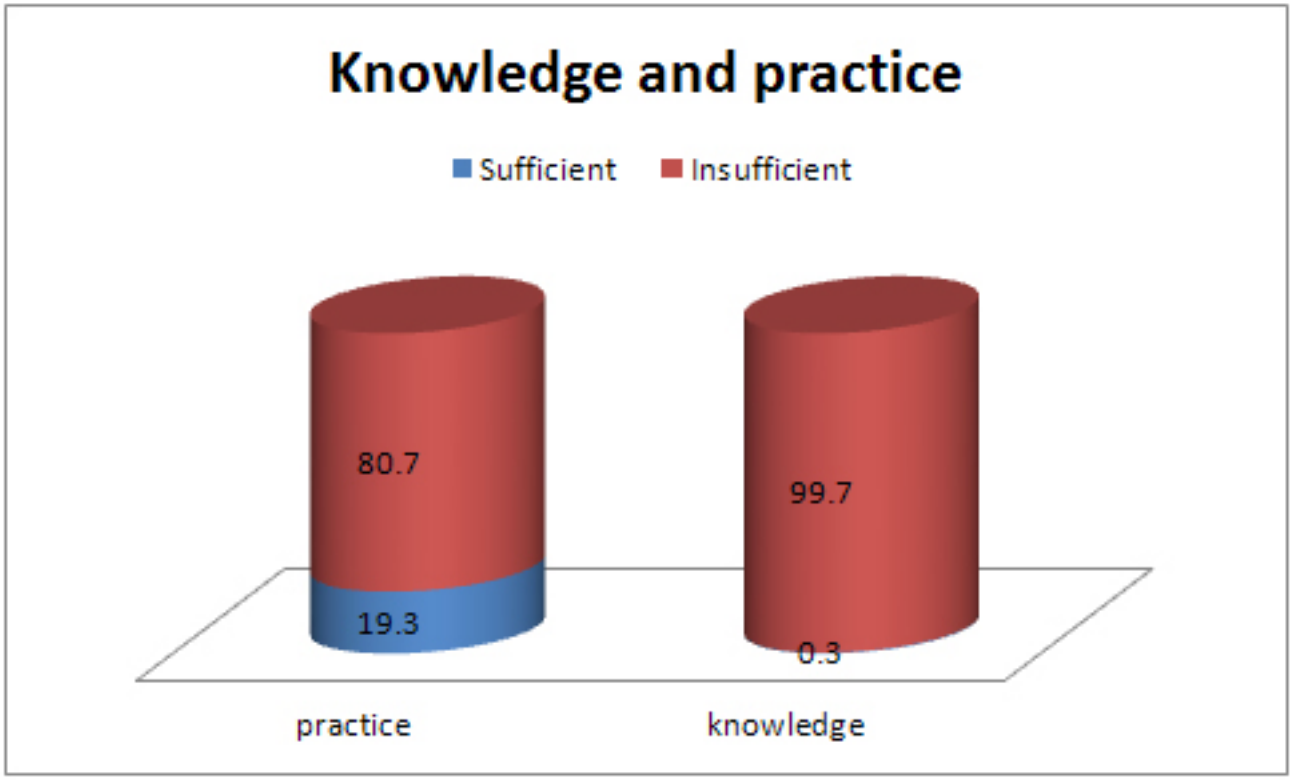
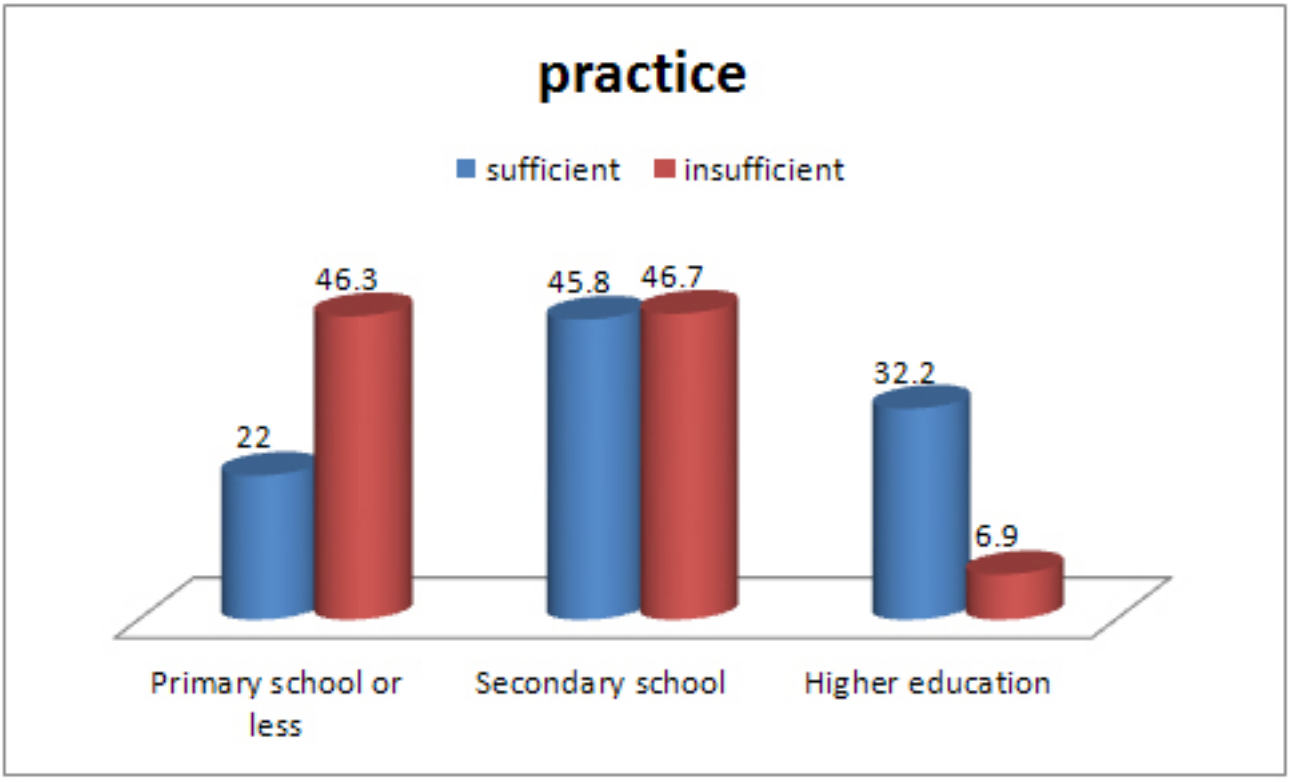


Table 6: Relation between different parameters and practice grade:

Variables		Practice grade				P-value
		Sufficient (N=59)		Insufficient (N=246)		
		N	%	N	%	
Age groups	20-25	11	18.6	42	17.1	0.244
	26-30	10	16.9	40	16.3	
	31-35	7	11.9	62	25.2	
	36-40	13	22.0	84	19.5	
	≥41	18	30.5	54	22.0	
Gender:	Male	7	11.9	36	14.6	
	Female	52	88.1	210	85.4	0.583
Education:	Primary school or less	13	22.0	114	46.3	
	Secondary school	27	45.8	115	46.7	<0.001*
	Higher education	19	32.2	17	6.9	
Residential status:	Family	56	94.9	231	93.9	
	Alone	3	5.1	11	4.5	0.605
	Dormitories	0	0	4	1.6	

Figure 2: Relation between practice and education among the studied group



Discussion

Foodborne illness breakouts remain an issue, suggesting a culture that does not follow safe food preparation methods. Foodborne illness prevention requires that both food manufacturers and consumers have an adequate understanding of hygienic and safety requirements. Customers' understanding, and practises about these concerns, on the other hand, is limited. Customers' knowledge, and practises about food service standards, as well as potential associated factors, was investigated in this study.

The bulk of the participants in this study were women (85.9%). Only 11.8 % of the participants have a high level of education. The age groupings were virtually evenly distributed. The vast majority of people (94%) live with their family.

Regarding meal frequency away from home, 81.6 % of individuals eat meals outdoors practically every day. Only 11.8% of people have personally suffered food poisoning. In 66.9 percent of cases, family and friends were the primary source of food safety information.

El Sakhy et al. in 2020 [4]. Conducted a study to determine the knowledge, practises, and attitudes of elderly persons in Marsa-Matrouh about food safety, and found that a few of the participants had experienced food poisoning in the previous year, which occurred by going to restaurants and eating outside their homes, while about (50.8%) made their meals by themseves. Television was the primary source of knowledge on food safety, followed by social customs (38.7 percent and19.4 percent respectively).

Ashkanani et al. in 2021[10] conducted a study to examine the food safety students' knowledge at Kuwait's Faculty of Basic Education. Merely 10% of the students said they always make their own food, while 41.7 percent said their mothers are housewives, and they prepared their food. Nearly 47 % of students said their nannies prepared meals in their homes. For the students, social media and the Internet were the primary sources of food safety information (49.6%).

Only 0.3 percent of the participants in this study had sufficient knowledge regarding food safety, while 19.3 percent had sufficient practise.

Fawzi and Shama. 2009 [11] investigated Food Safety Knowledge and Practices between Women Who work in Alexandria University, Egypt, and discovered that average mean percentage of safe practices in food handling variables, processing, and cooking (70 and 77.5, respectively) were substantially greater than its relating knowledge (60 and 70 percent). The percentage of knowledge from the other two variables, purchase & keeping, and hygienic practices (64.5 and 73.8%, respectively), was likewise greater than their related practises (63 and 71%).

This suggests that, despite their lack of awareness, some women follow the necessary protocols. This conclusion might be explained by the fact that these women were taught correct preparation and cooking skills by their parents or other relatives who did not have the necessary skills.

In research conducted in Sohag by Hamed and Mohammed (2020) [12], who evaluated food safety knowledge about food serving, it was discovered that (39 %) had proper food

handling awareness and (56.3%) were using adequate food safety measures.

Rahman et al., 2012 [13] study of food safety awareness between food providers in Borneo, discovered that only a small number of participants had adequate practise (10.8%) while respondents had adequate knowledge (37%).

This was in contrast to Iwu et al., 2017 [14], who researched food safety awareness across Nigerian food providers and discovered that (81%) had good food safety knowledge.
In the present survey, roughly (21.3%) of people know that after using a cutting board to cut uncooked meat or poultry, they should wash it with soap and rinse it under hot water. (36.1%) of those polled knew that they thawed frozen food in the refrigerator, and (20.0%) know that if the power is turned out and the beef, chicken, or other fish in the freezer thaws and feels warm, they should throw it in the trash.

According to a survey conducted by Hamed and Mohammed (2020) [12], 45% of respondents believed that vegetables and uncooked meat should not be processed on the same chopping board, and 21.8 percent claimed that they often isolate uncooked meat from cooked meals.

This study's high proportion of customers with knowledge of raw meal preparation was consistent with a study by Redmond et al. 2004 [15], that found that even more than 90% of clients knew the significance of isolating kitchen utensils for uncooked and cooked foods. Similar research on the Irish population discovered that just 3% of people reused the knives they had previously used for uncooked meat cutting.

According to research conducted by El Sakhy et al. 2020 [4], nearly 78 percent of participants always kept uncooked and cooked food apart. And over half (56.5 percent) of them never permit raw chicken, fish, or meat to come into contact with one another, and nearly two-fifths mentioned that after buying food products that could spoil in a brief period, they often kept them in the fridge within 2 hours, and they often defrost frozen stuff on countertops/radiators (46 percent and 39.5 percent respectively).

In the current study, 14% of those interviewed were aware that Staphylococcus bacteria may cause food poisoning. Approximately 7 percent of the participants in the study are aware that if they do not wash their hands after touching food, they may infect the next meal they contact with Salmonella germs. Approximately 10.8 percent of the study participants are aware that all foods are found to be safe when cooked to a temperature level of 74. Nearly 4% of the study participants are aware that 4 °C is the highest temperature fridges must be set to in order to maintain food safety.

The main objective of this study done by Ismail KA, et al. 2018 [7], was to analyse the general Saudi population's awareness, attitude, and behaviours about food safety awareness. 75.7 percent of the population had a positive attitude and followed health and food safety, such as rinsing their hands before eating. 78% did not check the fridge temperature. 61.8 percent of the study population was aware of the optimal temperature for bacterial development, which is between 4 and 50°C, and around 73.5 percent of the public was aware of illnesses that may be transferred by food. However, only 27.2 percent of the public were aware of an appropriate way of beef thawing.

According to El Sakhy et al. 2020 [4], over two-fifths of the elderly retain cooked meals at room temp till they cool, do not handle cooked foods after handling raw foods, and also don't freeze products once more after defrost.

In the current study there was a statistically significant difference between the studied participants regarding practice grade and education with (78%) of participants with sufficient practice being moderately or highly educated. This is in line with many study findings that show that the higher the participant's education, the more food safety practises they have, and vice versa.

According to Alqurashi et al. 2019 [16], who studied Food Safety Knowledge and Practices between Food manufacturing Personnel in Al Madinah Hospitals, Saudi Arabia, there was a strong correlation between participants' education levels and food safety precautions, with 48.5 percent of participants with a university education having a greater level of safe food handling.

Sibanyoni et al. 2017 [17] discovered a strong relationship between adequate food safety knowledge and practises and the educational status of food service workers in school feeding programmes in Mpumalanga, South Africa.

Others, on the other hand, claimed that there were no significant variations in participants' knowledge and educational backgrounds, as discovered by Al-Mohaithef, 2014 [18], who researched food safety knowledge and practises of food service employees in Riyadh's hospitals, Saudi Arabia.

This difference might be explained by the difference in occupational level, with his study focusing on particular food service personnel and this study focusing on non-specified professions.

Conclusion and Recommendations

According to the current survey, the general community has insufficient safety knowledge and practices. The disparities in practise and knowledge highlight the importance of implementing on-going food safety education and health awareness programmes. In addition to the increased demand for improving the consumer protection system, as well as the power for food production monitoring and assessment by local authorities, and expanding public understanding of environmental standards for food services.

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