

# An Observational Study of The Awareness of Food Safety Practices in Households in Trinidad

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**ABSTRACT:** An observational study on the awareness of food safety practices in 350 households in Trinidad indicated 95 % of respondents did not know how to prepare, transport, store and serve food safely in the home. It was found that 98 % of respondents did not wash their hands properly prior to preparing food and before eating. Countertops were cleaned and sanitized by only 45 % of respondents. Cutting boards were not cleaned and sanitized prior to use and between use for meat, fish and poultry by 57 % of respondents. Respondents (67 %) said that raw meat, fish, and poultry were not wrapped properly and were often inappropriately placed above other foods where they could drip on and cross-contaminate other foods. Many respondents did not follow temperature-time relationships in cooking foods. No thermometers were used to measure the internal temperatures of cooked foods to verify doneness in all surveyed households. Sauces, soups and gravies were not brought to boil when cooking or reheating. The internal cooking temperatures of meat and poultry were below the accepted internal cooking temperatures to effectively destroy bacteria and other pathogens. The foods preparation practices in the surveyed households were below the generally acceptable standards for basic safe food preparation. Greater food safety awareness and targeted public education programmes are needed in order to avert a growing public health crisis.

**Key words:** Food safety practices, public health, consumer awareness, household practices

## INTRODUCTION

Food safety is a fundamental human right. It is defined by the FAO/WHO as the assurance that food when consumed in the usual manner does not cause harm to human health and well being (WHO, 2002). Food safety is of utmost concern in the twenty-first century (Pattron, 2004a). In this fast pace society we live in food is manufactured in bulk by a few and may be consumed by many. This poses a threat to consumers worldwide (WHO, 2002, Pattron, 2004a). Negligence and/or willful mistakes during processing, storage, transport of food and food products can lead to severe pain and human suffering worldwide (Pattron, 2004b). The use of latest technologies in food sciences such as the development of genetically modified foods and irradiated foods without sufficient scientific data may pose tremendous risk to families, communities, societies, populations and nations, this coupled with increase methods of transport and storage may now allow food to reach almost every country in the world in the shortest possible time (McSwane, Rue & Linton, Pattron, 2004c; Pattron, 2004d; WHO, 2002). But despite living in a technological era, many people, particularly those living in developing countries may not be sufficiently educated or informed about food safety and why is it important to good health and prosperity (Pattron, 2004c). The purpose of the present study is to provide for the first time data on

food safety as it relates to the consumption of high risk foods and unsanitary food-handling practices carried out in the home setting. Recommendations were then made to address any identified deficiencies in food safety practices.

## METHODOLOGY

Data was collected from two hundred (n = 350) randomly selected households throughout Trinidad, during the time period October to December 2005. A questionnaire comprised fifteen (n = 58) questions that ranged from temperature control (n = 7), sanitation (n = 17), personal hygiene (n = 11), handling raw and cooked food (n = 4), transporting food (n = 6) and time-temperature relationships (n = 13) when preparing food. The questionnaire was administered in person and the average time taken to complete it ranged from one hour to one and half hours. Completed questionnaires were collected and returned to the Ministry for analysis and interpretation using standard statistical analyses.

## RESULTS

### Questionnaire attributes

A 100 % completion rate was observed for questionnaires. This questionnaire was pretested prior to its use in the present study for easy of understanding, accuracy and consistency.

### **Specific knowledge of food hygiene in the home**

When respondents were asked about what are some of the main hygienic practices in the home, the top ten practices included: washing hands (67 %), clean work surfaces (64 %), cleanliness (61 %), good kitchen practices (35 %), wash hands after handling raw meat (26 %), store properly (20 %), cook meat thoroughly (17 %), cook chicken thoroughly (15 %), store meat at the bottom of the fridge (14 %) and separate raw and cook food (6 %).

### **Personal hygiene**

The majority of respondents (97 %) did not use caps or hair nets and aprons when preparing food. Only 3 % wore hair nets and aprons. When respondents were asked how they wore hair nets, more than half the respondents indicated that the nets did not cover the entire head. Many believed that hair nets were mainly for style. The condition of clothes worn by respondents (51 %) were often covered with food debris and soiled. When respondents were asked how often do they clean aprons and hair nets, 69 % said every four months, 55 % said every six months, 35 % never or not at all, while 47 % disposed of hair nets and aprons when they became too dirty.

### **Counter tops**

Counter tops were composed mainly of wood (57 %), concrete (28 %), plastic (15 %) and stainless steel (2 %). The condition of counter tops were poorly kept, rough, cracked and grooved that facilitated the accumulation of food and made cleaning and sanitizing difficult. Counter tops were cleaned with water only, using a damp washcloth most often before (68 %), during (45 %) and after (13 %) food preparation. The majority of respondents did not sanitize counter tops (78 %). When respondents were asked if they knew the difference between cleaning and sanitizing, 79 % said they did not know.

### **Meat storage**

When respondents were asked about how they arranged raw and cooked meats in the fridge, the majority indicated that raw and cooked meats were often stored on the same shelf (67 %), with fish (65 %), vegetables (57 %), fruits (67 %) often unwrapped/uncovered (56 %), and on top of other stored foods (78 %). Blood from raw meat often dripped and contaminated other foods. Even when foods were packed in the freezer they were packed over ice trays (78 %) often leading to contamination of ice and other surrounding food.

When respondents were asked why they think it was important to store raw meat at the bottom of the fridge the majority of respondents said they did not know (87 %) and packed raw meat in any vacant space in the fridge (78 %). Only one third of respondents believed that raw meat should be stored at the bottom of the fridge to avoid spread of bacteria/germs (46 %), to avoid food poisoning (36 %), to prevent blood from raw meat dripping on other food (47 %). Some respondents believed that the bottom of the fridge is the coldest part of the fridge (38 %).

### **Hand washing**

When respondents were asked when they washed their hands seventy five (75 %) said that after going to the toilet. Hands were washed seldomly (69 %) after handling raw meat, poultry, fish, seafoods and eggs, when coming into the kitchen (45 %), before preparing food (35 %), after preparing food (47 %), after handling cooked meat (36 %), when they are dirty (45 %), when leaving the kitchen (12 %), after handling fruit and vegetable (39 %) and after washing up (41 %).

When respondents were asked why is it important to wash hands after handling raw meat 25 % said to prevent spread of bacteria/germs, to avoid food poisoning (14 %), to avoid cross contamination (46 %) and don't know (15 %).

When respondents were asked what do you wash your hands with, most respondents (53 %) replied that they merely used water only (78 %), water and soap only (27 %), water, soap and sanitizer only (18 %). When respondents were asked to describe the steps in hand washing, most respondents (87 %) indicated they wet hands first, followed by soaping and rinsing. When respondents were asked how long you soap your hands, respondents replied 2 seconds (67 %), 5 seconds (48 %) and 6 seconds (15 %). When respondents were asked how they dried their hands after washing, two thirds of respondents replied on their clothes. The remaining one third said they dried their hands on paper towels, air dried and on anything close by in the kitchen.

### **Washing food**

The majority of respondents (52 %) did not wash fruits and vegetables in cold running water before use. Fruits and vegetables were briefly rinsed for a period of 2 seconds (49 %), 4 seconds (35 %) and 7 seconds (16 %) and served. In some cases (56 %)

fruits and vegetables were washed with potentially toxic detergent/soap and scrubbed to remove traces of soil and other debris.

### **Refrigeration & cooling**

When respondents were asked when you would consider putting food in the fridge after cooking food which is not going to be served immediately, 79 % responded more than 4 hours after cooking, 39 % responded 1 hour after cooking, 47 % responded half hour after cooking, 27 % responded two hours after cooking, 15 % responded until it is lukewarm, 8 % responded until it cooled down slightly, 7 % responded as soon as it is cooled and 12 % responded straight after cooking.

When respondents were asked why it is important that food should be left to cool down before being put into the fridge to chill 64 % did not know why this should be done. Thirty percent believed that warm food would warm up the fridge and other food contained therein, 20 % believed that warm food would make the fridge use more electricity, only 28 % believed that warm food would encourage bacterial growth.

When respondents were asked what temperature food should be chilled at, many responded (56 %) at 8 °C, while, 45 % responded don't know. When respondents were asked what temperature food should be frozen at, many responded (59 %) at 0 °C, 36 % responded at 3 °C and 27 % responded don't know.

### **Cooking food thoroughly**

When respondents were asked why is it important to cook chicken, pork, beef, seafoods, eggs thoroughly, 35 % said to avoid food poisoning, 23 % said to kill harmful bacteria, 18 % said to avoid salmonella and 16 % said to make it taste better. Thermometers were not used to check the internal temperatures of cooked foods in particular meats, poultry and seafoods during cooking (100 %).

Foods that were cooked were not cooked at the proper internal temperatures to kill bacteria and prevent spoilage. Foods placed in the microwave were not rotated to avoid "cold spots". Soups, sauces and gravies were not brought to a boil when reheated. Common cooking practices involved tasting cake batter with raw eggs (58 %) and tasting cooking food using the same spoon (47 %).

### **Holding food**

When respondents were asked if they knew about "hot-holding" potentially hazardous foods, 79 % responded said they did not know how. When respondents were asked about "cold-holding" some respondents (68 %) said it involved keeping food in the fridge at 5 °C or lower. Cooked foods were kept at least five days on average in the fridge and not re-heated to above 60 °C.

### **Transporting food**

Foods bought by respondents from supermarkets and other food outlets were often transported in hot cars and not taken home immediately. The average delivery time for perishable potentially hazardous foods was 4.2 h. These foods were not transported in coolers or placed on ice packs to maintain freshness and prevent deterioration. Potentially hazardous foods were packed between ready-to-eat foods and other processed foods in the same bag. Even when foods were prepared for picnics or lunches, they were not packed in coolers or on ice packs. When foods were placed in the freezer and taken out again they were thawed out mainly at room temperature (78 %), under cold running water (32 %), in the refrigerator (26 %) and in the microwave (14 %).

### **Trash disposal**

Trash containers were located beneath counter tops in most cases (79 %). These containers did not have covers and were located in close proximity to where food was prepared. In some cases trash containers were not emptied in a timely manner (67 %). Trash containers that had lids (26 %) were often touched (open and closed by hand) when preparing food. When respondents were asked when they emptied their kitchen trash, 56 % responded during food preparation, 27 % responded before food preparation, 37 % responded after food preparation and 18 % responded any time convenient. When respondents were asked how often were kitchen trash emptied, 49 % responded when full, 38 % responded as needed and 27 % responded every week. When respondents were asked how often do they clean and sanitize trash containers, 79 % said every month, 56 % every three weeks and 23 % every week.

### **Pets**

Pets such as dogs (55 %), cats (37 %) and caged birds (28 %) were often found in most cases in and in close proximity to food preparation areas.

### **Pests**

Most respondents admitted that they were often plagued with ants (67 %), flies (46 %) and cockroaches (25 %). These vermins were particularly prevalent on counter tops (47 %), in cupboards (36 %) and in trash containers (31 %).

**Attitudes to food hygiene & food poisoning**

When respondents were asked weather food poisoning can be life threatening, 76 % agreed it can be, while 26 % percent disagreed. Poor food hygiene (69 %) and sanitation (45 %) were regarded as two of the major factors that can cause food poisoning. Respondents (89 %) felt that they were not well informed about food hygiene issues and need further information. Respondents believed that this training should be provided by the Ministry of Health, Food and Drugs Division (86 %), Public Health Division (46 %) and Ministry of Trade, Consumer Affairs Division (26 %). When respondents were asked whether they believed that training can significantly assist in producing safe food at home, 95 % responded in the affirmative.

**DISCUSSION**

The present study has shown that food safety education is greatly lacking in the homes surveyed in Trinidad. The good news is that householders are willing to change and adopt more safe food handling practices if given the opportunity to do so. It is therefore up to the relevant agencies, governmental and non-governmental organizations to take the initiative and establish food safety training programmes that specifically target the householders and children. Why? Food safety involves protecting food from anything that could harm the health of consumers (Patron, 2004c; Patron, 2004d). Adherence to high standards whether in the home or elsewhere enable everyone to enjoy their food without illness, injury or other problems, but poor standards can lead to all kinds of harm and even death. Food prepared for the family and the general public must be done to ensure that the safety of food does not compromise the lives of family and friends. This is a legal and moral responsibility. Some useful food safety recommendations for the home include:

- (i) When buying potentially hazardous food, from groceries and other food service providers decide before hand to take meat, poultry, shellfish, eggs and seafoods directly home. It may be advisable to take along a cooler for perishables. Always refrigerate potentially hazardous foods within 2 h.

- (ii) It is always a good idea to verify that the refrigerator and freezer are at the correct temperature. This may be done using an appliance thermometer. Any deviation should be corrected immediately to prevent the growth of pathogenic microorganisms and the possibility of food borne illness.
- (iii) Ensuring good personal hygiene and maintaining a clean workplace/kitchen.
- (iv) Never taste a food to determine if it is safe.
- (v) Protecting food from anything that could cause harm such as pets, pests, poor hygienic and sanitary practices.
- (vi) Following good personal habits, such as proper washing hands with soap and water for 20 seconds before, during and after handling food, especially after handling raw meat, poultry, eggs, seafood, after touching the trash container, bathroom, after changing diapers, after blowing the nose or sneezing or whenever necessary.
- (vii) Wash hands, counter tops, equipment, utensils and cutting boards with soap and water immediately after use and after changing tasks.
- (viii) Thaw food in the refrigerator, never at room temperature.
- (ix) Thermometers should be used to check the internal temperature of meats during cooking and at the end to determine whether or not a safe internal temperature has been reached.
- (x) Staying alert and update to food safety hazards that are available through reading relevant books, videos, internet searches, food safety programmes and workshops.
- (xi) Following the rules for food safety in the home with care. Always use the four C’s when preparing foods in the home:
  - Clean and sanitize all non-food items.
  - Cover and separate potentially hazardous foods from other cooked and ready-to-eat foods.
  - Chill foods.
  - Cook foods thoroughly and serve “piping hot”.
- (xii) Being able to deal and handle effectively with potentially dangerous food so as to prevent any foodborne illness. Potentially hazardous foods are foods that support the rapid growth of infectious or toxigenic microorganisms when conditions are ideal such as protein-rich,

- moist foods left at danger zone temperature for some time. Some examples of potentially hazardous food include cooked meat and poultry, fish salads, milk, eggs, shellfish, seafoods, cooked rice, raw seed sprouts, melons, garlic and oil mixtures.
- (xiii) All potentially hazardous foods should be treated with extreme care. When dealing with potentially hazardous food, it is important to:
- Avoid touching food with bare hands.
  - Use clean utensils.
  - Keep raw, potentially hazardous foods and ready-to-eat foods separate. Raw foods are major sources of pathogenic bacteria.
  - Cover foods during storage to prevent cross-contamination.
  - Keep food out of the danger zone 5 ° C to 60 ° C whenever possible during preparation to prevent bacterial growth in numbers or the formation of toxins. When holding hot food maintain a temperature of 60 °C or above. When holding cold foods maintain at a temperature of 5 °C or below. When reheating food, this should be done at 75 °C.
- (xiv) Adopt and follow the golden rule about food safety: “If in doubt, throw it out.”
- (xv) Develop and implement health education programmes and curriculum via the electronic, printed and internet media that should cover general food hygiene and basic sanitation. These programmes should be facilitated by both private and public agencies such as Governments, NGOs, industries, research institutions, academia and all elements in the foodchain. Such programmes should facilitate and educate householders, consumers and the general public about the importance of product information and to follow instructions accompanying products in order to make informed choices. In particular all stakeholders should be informed of the significance of the relationship between time-temperature control and foodborne illness and ways and means to adopt and implement the necessary corrective actions to ensure food safety and well being for all.
- (xvi) Adopt and implement training and further training through the avenue of community centers and community out-reach programmes to encourage food handlers and householders to become more familiar and better competent in food safety management and its practices. This often translates into increased profits and decreased health care costs occurring as a result of foodborne illnesses.
- (xvii) Establish food safety awareness programmes through essays, poster competitions, games, plays, live programmes starting from the most elementary learners in primary schools to tertiary level learners in colleges and universities. This increased food safety awareness will be taken back by students to their respective homes, communities, societies and countries and this would lead to the spread and general acceptance and perception of food safety and health being synonymous, both of which are indispensable to a productive life and human well-being.

**IMPLICATIONS OF STUDY**

The present study is the first of its kind to assess the food safety practices in the home and to make the necessary recommendations on any identified deficiencies. The food safety practices in households examined were well below the accepted standards as required by the Trinidad Food and Drugs Regulations, Public Health Division and international standards such as those prescribed under the food safety laws in United States, United Kingdom, European Union and Codex Alimentarius. There is an urgent need to adopt and implement the above mentioned proactive measures as necessary corrective actions to prevent, reduce and eliminate the burden of foodborne illnesses in the home.

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