

Household consumer food safety study in Trinidad, West Indies

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ABSTRACT: There has been minimal research on consumer food safety knowledge, perception and food handling practices at homes in Trinidad, West Indies. Questions were asked on the demographic characteristics of 84 respondents, reporting of food - borne illness, hand washing practices, purchase of foods, separation of raw and cooked foods, cooking of foods, thawing and cooling of foods and consumption of raw eggs. The study found 52.4% of consumers had experienced some form of food- borne illness with main symptoms of vomiting and diarrhea (48.8%). Of those who had experienced food borne illness, only 23.8% sought medical treatment. If a food was found to be tampered or contaminated, most consumers (69.0%) failed to report to the relevant authorities. Most respondents washed their hands with soap and water before preparation of meals (88.1%), after using the toilet facilities 92.9% and after handling raw foods or contaminated objects (84.5%). The minority of respondents (4.8%) purchased foods from vendors who did not display food badges, while some (35.7%) 'sometimes' bought foods. When consumers were asked whether they looked at food labels and expiry dates before purchase of foods, 61.9% responded in the affirmative, while 33.3% indicated 'sometimes' Some (16.7%) consumers did not separate cooked or ready to eat foods from raw foods. Most consumers washed vegetables (97.6%) and meat (91.7%) before serving or cooking. Some consumers (45.2%) thawed frozen foods at room temperature, while others (33.3%) did so 'sometimes'. Although the study was of limited sample size, it emphasized the need for public food safety education to consumers.

Key words: Trinidad, West Indies, consumers, food safety knowledge, food handling practices, public education

INTRODUCTION

Ask someone about food - borne disease and the initial response will be reflection on a personal experience. Most will recount some dramatic episode in which they ate 'the incriminated item' and before they knew it they were feeling ill. The Center for Disease Control and Prevention, Atlanta has estimated that about one-third of the inhabitants in the United States acquire a food borne disease annually (Griffiths, 2002). Every day in the United States, roughly 200,000 people are sickened by a food-borne disease, 900 are hospitalized and 14 die (Schlosser 2001) The Caribbean Epidemiology Centre (CAREC, 2002) reported that there were 2597 reported cases of food-borne illness in 2000 and 1905 cases in 2001 (as up to 8th February, 2002) for CAREC member countries. While adequate, nutritious and safe food is essential to human survival, food can also cause or convey risks to health and even life itself. International concern about consumer food safety knowledge has prompted considerable research to evaluate domestic food-handling practices (Redmond and Griffith, 2003).

International studies (Bryan 1988; Scott *et al.*, 1982, Scott, 1996) indicate that a significant proportion of foodborne illness arises from practices in the home kitchen. In Europe, the home was one of the most frequent places of acquiring foodborne illness (WHO, 1992). Epidemiological studies have indicated that sporadic cases or small outbreaks in homes account for the majority of food poisoning incidents (Worsfold and Griffith, 1997). With a population of about 1.26 million in Trinidad and Tobago, (Tradeport, 2003), there has been little research on food safety issues of consumers. Trinidad has a well - established and growing middle class who will continue to demand ready and convenience foods. As in other modern societies, many women work outside the home and thus there are increasing demands on homemaker's time (Trinidad and Tobago: Food Market Reports 1996). A considerable amount of food preparation and handling occurs in the domestic environment, so research and consumer education regarding the risk of unsafe food-handling practices is an essential element of the prevention of foodborne disease (Kafenstein, 1997). People's behavior at home is probably a good reflection of their knowledge or at least what they believe is important (Daniels, 1998).

There has very little published information on food safety handling practices by the Trinidadian and Tobagonian consumers. The data provided in this study would reflect food safety knowledge, perception to food safety and how foods are handled at home by consumers in Trinidad, West Indies

1.0 METHODOLOGY

1.1 *Demographics of consumers*

The questionnaire was self-administered to randomly chosen household consumers in Port-of-Spain (North- West), Arima (North- East), and St. Augustine (East) Trinidad, West Indies between October to November, 2002. The sample size comprised of 84 willing respondents, (39. 9% male and 63.1% female) who were between 18 - 63 yrs (16-24 yrs - 45.3%; 25-34 yrs - 32.3%; 35-44 yrs - 11.6%; 45-54% - 9.6 % and 55-64 % - 1.2 %). The questionnaire was pre- tested by 10 consumers to identify the wording and sequencing of the questions, administration and length of interview. In a review of consumer food safety studies, self - administered questionnaires have been used to reach 62 to 824 respondents (Redmond and Griffith, 2003). In this study, a household consumer was defined as person who was over 16 yrs of age, who purchased and prepared foods regularly at home and had accessed to a refrigerator in the kitchen In this study, the respondents were single (69%), married (25%), divorced (2.4%), in a common law relationship (2.4%) or other (1.2%). Their religion affiliations were as : 39.3% Roman Catholic, 21.4% Hindu, 8.3%, 4.8% Anglican, 3.6% Seven Days Adventist, 3.6% Islam, 3.6% Presbyterian, 2.4% Pentecostal, 1.2% Spiritual Baptist and 11.9% not given/other/none.

1.2 *Questionnaire design*

The questionnaire consisted of 18 checklist questions on demographic characteristics (sex, age, marital status, religion) of respondents, reporting of foodborne illness, hand - washing practices, purchase of food, separation of raw food from raw or ready-to-eat foods, cooking practices, thawing and cooling of foods and consumption of raw eggs. In many studies have shown that self-reported practices do not correspond to observed food safety behaviors (Redmond and Griffith, 2003). The responses to the questions were categorized as either always, sometimes or never. A blank section was left in the questionnaire to allow the respondent to write his or her comments relevant to the questions. All data were managed in a spreadsheet (EXCEL 97, Microsoft) Responses were reported in percentages.

2.0 RESULTS & DISCUSSION

2.1 *Reporting of foodborne illness*

Illness resulting from foodborne disease is defined as 'a disease of an infectious or toxic nature caused by or thought to be caused by the consumption of food or water' (Tirado and Schmidt, 2000). An alarming 52.5% of consumers had experienced some form of perceived foodborne illness, with 48.8 % had symptoms of vomiting and diarrhea, 36.9% blurred vision, nausea and abdominal pain, 20.2% chill and fever, 19% encountered headaches and 1.2 % included other e.g dizziness. Foodborne disease is widely recognized from the acute effects on the gastrointestinal tract, but also includes other symptoms throughout the body (Arthur 2002). Common symptoms of foodborne illnesses are diarrhea, abdominal cramping, fever, headache, vomiting, severe exhaustion and sometimes blood or pus in stools (FSIS 2002). The true incidence of foodborne disease is difficult to ascertain because cases of illness are underreported (Lake *et al.*, 2000). It is believed that in industrialized countries less than 10% of the cases are reported, while in developing countries reported cases account for less than 1 % of the total (WHO, 1984). The incidence of foodborne illness that is home derived is difficult to determine with any accuracy. Sheard (1993) estimated that homes accounted for a greater number of foodborne illness events than other reported sources. Borneff *et al.* (2001) reported that illness from foods consumed in private homes is three times more frequent than that arising from foods consumed in cafeterias (Borneff *et al.*, 2001). If foodborne illness occurred in the home, it would usually affect a small number of people and may not be detected in the public health surveillance. Only 23.8% of those who experienced foodborne illness sought medical treatment, while 15.5% reported to the health authority 'sometimes'. According to the Center for Disease Control and Prevention (CDC), Atlanta more than a quarter of the American population suffers a bout of food poisoning each year with most of these cases never been reported to authorities or properly diagnosed (Schlosser, 2001). The Caribbean Epidemiology Center (CAREC) acting on behalf of 21 member countries and the Pan American Health Organization is notified on reports and collates information on food-borne illnesses from the various public health centers in Trinidad and Tobago and throughout the Caribbean.

The majority of consumers (69%) did not notify any Public Health Department of a suspected or contaminated or tampered product while only

8.3% reported on the default food product 'sometimes'. In a study in Jamaica, the majority of urban householders had never contacted their local Health Department or the Ministry of Health (Knight, 2003). When a consumer sense that there is a problem with any product, it should not be consumed. Therefore, it is important to practice 'when in doubt, throw it out' (FSIS 2002).

2.2 Hand washing practices

The role of hands in transmission of disease has been established (Emery, 1990). From the study, it was found that 88.1% of consumers washed their hands thoroughly with soap and water before and after preparing meals, however 10.7% of consumers did so 'sometimes.' Most consumers (92.9%) reported of washing their hands after using the restroom and 84.5% consumers after handling raw foods, garbage, dirty dishes etc. Study results show that perceptions of what constitute safe hand-washing practices may be honest but inaccurate (Redmond *et al.*, 2001). In a National Australian food safety telephone survey, most people (82.3 %) washed their hands with soap or detergents and 81.6 % felt it was very important to wash hands before and after preparing meals (Jay *et al.*, 1999). In a video-survey of Australian domestic food handling practices, notably almost one-half (47%) of the persons observed did not wash their hands after handling raw meals, or when they did wash, they washed without soap (44%). Also hand washing was not performed for a long time period as was claimed by 22% of the household and 19% of households that claimed to have soap available in the kitchen did not have it available (Jay et al. 1999). Poor hand washing practices inevitably lead to retention on the hands of bacterial and viral pathogens, which are obtained from handling raw produce or from toilet activities (Ansari *et al.*, 1989; Snelling *et al.*, 1991). These pathogens may then be transferred to prepared ready-to-eat foods directly to the mouth or to other household members. According to the Educational Foundation of the National Restaurant Association (NRA,1995), and Food HACCP.com Newsletter (2002), proper hand washing procedures include not only water, but the use of water as hot as the hands can comfortably stand, moisten hands, soap thoroughly, and latter to elbow, scrub thoroughly, use brush for nails, rub hands together, using friction for 20 seconds, rinse thoroughly under running water, and dry hands, using single service towels or hot air dryer.

2.3 Purchase of foods

To sell food to the public in Trinidad, food service operators are required to have approved food

badges issued by the Ministry of Health to certify good health. However, a few consumers (4.8%) still purchased foods from vendors who did not display or had no food badges, while 35.7% of the consumers bought 'sometimes'. Most consumers (96.4%) felt that it was always necessary to use tongs in serving foods while a minority (3.6%) felt that this practice was unnecessary (Table 1). Hands are one of the principle vehicle for cross-contamination of infection agents onto ready-to-eat foods (Reybrouck 1986; Ansari *et al.*, 1989; Restaino and Wind, 1990; Snelling *et al.*, 1991). Thus, all food handlers should use tongs, scoops or other utensils to dispense food for customers (NRA, 2001).

Most consumers (61.9%) checked food labels always for 'expiry date' or 'use - by- date' when purchasing food products, while 33.3% of consumers 'sometimes' would check (Table 1). In a survey, college students in the United States usually discard foods that have passed the expiration date (Unklesbay *et al.*, 1998). Expiration times are meant to maintain product quality and safety (NRA, 1995). According to FSIS (2002), consumers should look for expiration dates on food labels, never buy outdated food and need to be alert to abnormal odor, taste and appearance of a food item. If, there is any doubt about its safety, do not eat it (FSIS 2002). The majority of consumers (82.1%) checked for damaged food packages, foul odors and discolored meat prior to purchase while 16.7% would check 'sometimes' do. Although, there may be an expectation of certain information on food labels, this does not mean the majority of consumers will actually use the information that is provided. Evidence suggests that only a limited number of people actually make regular use of the nutrition information which is provided (Jukes, 2000). However, consumers' increased knowledge about diet and health, concern about food safety and misrepresentation and access to information about new production and processing technologies have increased the pressure for greater label information (MacKenzie, 2001).

2.4 Separation of raw and cooked foods

Contaminated or uncooked raw foods can cause harmful microorganisms to be passed to safe foods and cause a foodborne illness (National Assessment Institute1998). From the survey most consumers (66.7%) stored cooked, ready to eat foods away from raw food always, while a disturbing 16.7% of consumers 'never did'. When asked why was it necessary to separate raw food from ready to eat or cooked foods, the following responses were given: to prevent cross contamination (31.0%), 'the food was 'not cooked' and 'could not have been eaten raw ' (3.6 %), ready to eat or cooked foods

cannot be stored long (2.4 %) and the rest (1.2%) reported 'it was unhealthy, against public health training, to avoid mixing of odors of foods, not a necessary practice' and was easy. Some consumers (49.8 %) provided no answers to the related Unprompted, 49% of respondents in an Australian survey knew the meaning of the term 'cross-contamination' (Jay et. al., 1999). It has been suggested that up to 36% of United Kingdom consumers and up to 22% of United states consumers did not recognize the importance of using separate or adequately cleaned utensils for the preparation of ready-to-eat foods (Redmond and Griffith, 2003) after the utensils have been used in the preparation of raw meat and poultry. This practice could result in

the potential transfer of harmful substances or disease - causing microorganisms from one food or food ingredient to another (NRA, 2001). Raw products should be kept in separate areas from cooked, ready to eat products to prevent contamination. The same utensils for raw and cooked products should never be used. According to the Educational Foundation of the National Restaurant Association (NRA,1995), a cooked product should never be placed on a food contact surface where a raw product has been without first washing, rinsing and sanitizing that area. Bryan (1988) suggested that the involvement of cross-contamination as a contributing component in food-borne infection has been underestimated in surveillance statistics.

Table 1: Consumer responses to purchase of foods

Questions about purchase of foods	% Response (N=84)		
	Always	Never	Sometimes
Do you purchase food from vendors without approved health/ food badges?	4.8	59.5	35.7
Do you think it is necessary for vendors to use tongs when serving foods?	96.4	0	3.6
Do you check for labels and expiry dates when purchasing food products?	61.9	4.8	33.3
Do you check for damaged food packages, foul odors and discolored meat prior to purchase?	82.1	1.2	16.7

2.5 Cooking of foods

Most consumers (96.4%) felt it was necessary to cook meat thoroughly, while 2.4% did not fully cook meats. A minority (8.3%) of consumers always judged the degree of cookness by color only, while 15.5% used color an indicator of the degree of cook-ness 'sometimes'. Although most consumers use color to visually evaluate the doneness as the meat is cooked, hence it is not recommended that color be used to judge the doneness of hamburgers because of the risk of *Escherichia coli* (Brown, 1999), but rather to know the temperature inside the meat to be considered safe. Consumers need to know how to cook foods for optimal safety (Jukes, 2002).

In this study, most consumes washed their raw vegetables (97.6%) or meats (91.7%) before cooking or serving. Only 2.4 % of consumers failed to wash meats before preparation of meals. When cooking fresh fruits and vegetables must be washed thoroughly and rinse in warm water. Soap or other detergents should not be used. If, necessary and appropriate, a small brush to remove surface dirt (FSIS 2002).

2.6 Thawing and cooling of foods

of ground patties (Snelling *et al.*, 1991), the problem is that some ground beef loses all pink color before it is fully cooked due to the denaturation of metmyoglobin (Warren *et al.*, 1996). In United States surveys, 28% of consumers considered a hamburger that was pink inside cooked (Nunnery, 1997). Meat pigments change color

Some consumers (45.2 %) committed a critical violation of thawing frozen foods at room temperature 30°C (86 °F) , while 33.3% 'sometimes' did. Only 20.2 % allowed the foods to be thawed in a refrigerator, or under running water. More than one-half of the respondents in a Jamaican study were unfamiliar with the correct procedure for freezing and thawing of foods (Knight, 2003). There are four safe thawing procedures: in refrigerated units at temperatures of no more than 7 °C (45°F); under portable running water at (21°C) 70°F or below, followed immediately by cooking,; in a microwave oven only when food will be cooked immediately afterwards and as part of the regular cooking process (NRA, 1995).

Some consumers (36.9%) would 'sometimes' store foods or left - overs for several hours (more

than 2 hrs) at ambient temperature 30C (86°F) before consumption, while 40.5% of consumers ate the prepared foods almost immediately. A significant percentage of consumers (69%) allowed hot foods to be cooled at ambient temperature, while only 17.9 % placed foods 'sometimes' in shallow containers to be cooled in the refrigerator. In a United States survey, 45% of consumer inappropriately left foods at room temperature after heating (Albrecht,1995). In a randomly selected Australian household telephone survey, 40 % of the respondents thawed raw meat at room temperature, 85% allowed cooked foods to cool at room temperature before refrigerating and 86% reported that they would cool leftover casserole or other food with meat, fish or poultry at room temperature (Jay *et al.*, 1999). Leaving food to cool at room temperature before refrigeration provides an uncontrolled time period where food is left in the temperature danger zone 5°C (41 °F) to 60°C (140°F) in which potential growth of microorganisms may occur (NRA, 2002). Any food that is not cooled after cooking or hot holding from 45 .5 °C (140 F) to 7°C (70 °F) in 2 hr and to (- 9 °C) 41 °F in an additional 4 hr for a total of less than 6 hr cooling time (NRA, 1995). According to FSIS (2002), food will taste better and be safely stored if consumers practice the following: place hot food in a shallow container, divide large quantities into smaller portions, cover loosely and refrigerate immediately, reheat thoroughly when ready to eat. Large bulk slows down cooling and permits prolonged bacterial growth (Daniels, 1998).

2.7 Consumption of raw eggs

The study revealed that few consumers (3.6) % ate raw eggs or consumed raw eggs 'sometimes' (8.3%). According to FSIS (2002), consumers should never eat raw eggs or foods that contain them.; this is especially the case for the very young, elderly, or immune - compromised (Brown, 1999). Eggs are an excellent breeding ground for microbial activity, and can become internally contaminated through a hen with *Salmonella enteridis* infection in her ovary or oviduct (Chen *et al.*, 1996) or from absorbing bacteria through its pores (Brown, 1999). *Listeria monocytogenes*, which can grow at refrigerator temperatures has been observed on whole eggs and may contribute to outbreaks (Schuman and Sheldon, 1997). All raw egg products should be pasteurized (National Assessment Institute, 1998).

3.0 Implications of the study

Overall the study highlighted the need for greater consumer education regarding safe food handling practices in the domestic environment. Multiple food safety responsibilities lie with the

consumers who must be cognizant of the level of safety associated with the foods as they not only purchase and receive products, but also provide foods for themselves and others. In many studies have shown that most consumers may believe they know how to handle food safely, but consumer information is not always correct and mishandling occurs. Food handling practices are of public concern, and action is required to reduce the likelihood of home-derived foodborne illness. An improvement in consumer food - handling behavior is likely to reduce the risk and incidence of foodborne disease. In a report on needs assessment for food safety and infrastructure in Caribbean Countries, it was found that food handler classes were available to the food service industry only on a sporadic basis and thus there was the need for food safety campaigns for consumers to promote safe food handling (CARICOM and USDA 2000). Thus it is hoped that government and industry could use the information presented to target food safety education for the Trinidadian public.

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