

TITLE PAGE

Spot the Mistake: Television cooking shows as a source of food safety information

Lisa A. Mathiasen, Benjamin J. Chapman, Bonnie J. Lacroix and Douglas A. Powell¹

Food Safety Network, Department of Plant Agriculture, University of Guelph,
Guelph ON N1G 2W1 Canada

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¹ Author for correspondence. Tel: 519 824 4120 X 54280; Fax: 519 763 8933; E-mail: dpowell@uoguelph.ca

ABSTRACT

Consumers receive information on food preparation from a variety of sources. Numerous studies conducted over the last six years demonstrate that North Americans rely on television as one of these primary sources. This research reports on an examination and categorization of messages that television food and cooking programs provide to viewers about preparing food safely. During June 2002 and 2003, television food and cooking programs were recorded and reviewed using a defined list of food safety practices based on criteria established by Food Safety Network researchers. Most surveyed programs were shown on Food Network Canada, a specialty cable channel. On average, 30 per cent of the programs viewed were produced in Canada, with the remainder produced in the United States or United Kingdom. Sixty hours of content analysis revealed, a total of 916 poor food-handling incidents. When negative food handling behaviors were compared to positive food handling behaviors it was found that for every one positive food handling behavior observed, 13 negative behaviors were also observed. Common food safety errors included: a lack of hand washing, cross-contamination and time-temperature violations. While television food and cooking programs are an entertainment source, there is an opportunity to improve and promote safe food handling.

Foodborne illnesses are a continuing concern in North America and around the world (12, 14, 15). Proper food handling practices are an integral component of any strategy to reduce the incidence of foodborne illness from farm-to-fork. While many health and food safety professionals are aware of the unsafe practices that lead to foodborne illness, consumers often lack familiarity with safe food handling.

Food safety messages, which intend to reduce the risk of food borne illness, should address the factors that lead to the highest incidence of foodborne illness and the most serious consequences (14). Practices that are commonly associated with foodborne illness include: inadequate heating, cooking and cooling; obtaining food from unsafe sources; poor personal hygiene; cross contamination; and improper storage of food. (3, 14, 18)

Past research has demonstrated that at least one major food safety violation occurs in 75 per cent of households; the most frequent critical violations were cross-contamination and neglect of hand washing (22). Other behaviors that might contribute to foodborne illness included misuse of common cloths/sponges/towels, and insufficient thermometer use (12, 14, 16). These findings indicate that errors in food handling are common (14), emphasizing the question: where are consumers receiving information about handling food safely?

Television plays a large part in the lives of North Americans, both as an entertainment source and as a source of information. Numerous North

American studies have demonstrated that consumers receive food safety information from television (5, 10, 21, 22, 23), and more specifically from television cooking shows (9, 21). The Canadian Food Inspection Agency's (5), 1998 Safe Food Handling Study found that 22 percent of Canadians learn about the proper way to cook, store and handle food from television and radio. There is a wide range of food safety coverage on television from news reports to commercial advertisements. However, because of their popularity, uniqueness and availability, television cooking shows serve as a particularly good site for assessing food safety information.

The objectives of this study were two-fold: i) to determine what information television cooking shows provide about handling food; and ii) to determine the frequency of positive and negative food handling practices on television cooking shows.

MATERIALS AND METHODS

Recording procedures in 2002 and 2003. From June 23- 30, 2002, the Food Safety Network recorded television cooking programs. The recorded content consisted of 47 programs from the Food Network Canada, one program from Television Ontario and eight programs from the United States Public Broadcasting System. Each program was either 30 minutes or one hour in length and a total of 34 hours of recording was completed.

The recording procedure was repeated from June 17- 24, 2003. Due to time restraints and available programming, television-cooking programs were only recorded from the Food Network Canada during the second recording session. The recorded programs consisted of 40 different programs and a total of 43 hours of recording was completed.

Viewing Procedures. As part of a class assignment for a graduate course taught at the University of Guelph, all television cooking programs were viewed by food safety students to help researchers develop an idea of the positive and negative food handling behaviors that occur during cooking shows. The definition of food handling behaviour used in the study was: any task or operation that a cooking show host could perform in the process of purchasing, storing, preparing or serving or cleanup of food preparation areas (14).

Two trained researchers re-watched 30 hours of the recorded material and analyzed the content of the television cooking shows in 2002 and 2003. Given that Canadians watch between 15.5 and 33.5 hours of television per week (19), 30 hours was randomly chosen to represent a snapshot of what some Canadians may be watching on a weekly basis. Each researcher independently analyzed the data and prepared for content analysis in two ways. First, they became familiar with positive and negative food handling practices. This included reading journal articles that discuss food handling practices leading to cross contamination in a kitchen environment and ultimately foodborne outbreaks (2, 3, 4, 6, 7, 8, 11, 13, 14, 16, 18, 20, 24, 25, 26). Second, the analysts

clearly defined the basic unit of analysis as 30-minute segments of television cooking programs that represented one or more positive or negative food handling practice. Each 30-minute segment was either an entire program or part of the cooking show. A total of 60 segments in 2002 and 56 segments in 2003 comprised the raw data for the content analysis.

Content Analysis. Content analysis organizes raw data into interpretable and meaningful themes and categories employing either deductive or inductive procedures (1). In the case of this research a deductive approach was applied by using a predetermined set of categories into which observed food handling practices were organized. After the organization was complete, the data were ready for analysis of relationships involving the predetermined categories using statistical methods.

The coded categories were determined based on the five critical food handling behaviors: practice personal hygiene, cook food adequately, avoid cross contamination, keep foods at safe temperatures and avoid unsafe food (14). There were 17 different coded categories making up 6 positive and 11 negative food-handling themes. Before analysis the coding scheme was reviewed by members of the Food Safety Network to verify for accuracy and completeness. Table 1 displays the coding scheme and definitions of the codes that were used to analyze the video clips.

While viewing the cooking programs researchers were aware that many of the necessary steps for meal preparation were completed before the cooking

program was recorded and were implied during the program. The researchers tried to account for this by only coding for obvious practices or instructions. Once coding was complete, the frequency of each coded category was determined.

RESULTS

The content analysis of 116, 30-minute television cooking show video segments from 2002 and 2003 demonstrates unsafe food handling practices were occurring at a frequent rate, and remained consistent between the two years as illustrated in Table 2. Observed safe food handling practices increased between 2002 and 2003. Reviewed television cooking shows demonstrate approximately 13 unsafe food handling practices for every one safe food handling practice. The most common unsafe food handling practices included: inadequate hand washing, cross contamination between raw and ready-to-eat food, failing to wash fresh fruits and vegetables and inadequate washing of cooking utensils and cutting boards as reflected in Figure 1.

The 17 different food handling behaviors used for coding purposes comprised 6 positive and 11 negative food handling themes. Table 2 displays the frequency of the food handling themes, demonstrating that poor personal hygiene, which occurred approximately four times per 30 minute segment, and cross contamination, which occurred approximately twice per 30 minute segment, were the two most commonly observed food handling behaviors.

DISCUSSION

Personal hygiene. For the purpose of this study hand washing was the main behavioral observation made for the theme of personal hygiene. Proper hand washing and drying have been shown to effectively remove contaminating microorganisms from hands to reduce the spread of foodborne illness (14, 15). This practice was found to be the most commonly neglected food handling behaviour. Poor hand washing practices were observed in 75 per cent of the 30-minute segments in 2002 and in 96 per cent of the 30-minute segments in 2003. Noticeable attempts to wash hands were observed more frequently in 2003 than in 2002; nonetheless, inadequate hand washing was also more apparent in 2003. In one 30-minute segment a cooking show host acknowledged that he or she did not wash his or her hands and tried to justify this by saying, "It [failure to wash hands] is okay if no one is looking." Only one host discussed the importance of hand washing and took the time to demonstrate proper hand washing techniques. Despite the fact that the sinks on cooking show sets are often non functional, it is important that cooking show hosts acknowledge the necessity of hand washing especially before beginning meal preparation and after handling raw meat and poultry.

Cross Contamination. The theme of cross contamination is broad and involves a number of different behaviors. Direct and indirect cross contamination behaviors were observed in 72 per cent of the 30-minute segments in 2002 and in 86 per cent of the segments in 2003. The most common form of

cross contamination observed was failing to separate raw and ready-to-eat foods. These observations demonstrate a potential risk of the transfer of pathogenic organisms from raw food to ready-to-eat foods and kitchen surfaces, which could result in foodborne illness. Another commonly observed form of cross contamination was inadequate washing of cooking utensils. Other cross contamination observations include: the use of raw meat wrappings to wipe off a cutting board which was then used for ready-to-eat food; the use of raw meat contaminated ingredients to make a ready-to-eat sauce; and the use of a spoon to taste test food and then, without washing, reusing the spoon to add ingredients. The failure to acknowledge and demonstrate the necessary steps to prevent cross contamination while cooking reinforces the need to improve food safety behaviors and messages on television cooking shows.

Observed Temperature Control. Assessing the temperature control behaviors of cooking show hosts was a difficult task; therefore safe temperature control was considered the use of a thermometer to determine doneness or the suggestion of thermometer use for determining the internal temperature of cooked food. Unsafe temperature control was considered advising viewers to use visual indicators (such as colour or texture of the meat) as an indicator of doneness when cooking meats and poultry. Previous observational studies have demonstrated that consumers display a tendency to undercook some meat and chicken, and it has been noted that consumers have been observed to rely on visual indicators to determine doneness (16). This study demonstrates that

temperature control also represents a problem with cooking show hosts. While the use of a meat thermometer to determine doneness was observed a total of eight times in all 120 cooking show segments, the advice to use colour as an indicator of doneness was three times more commonly observed.

Avoiding unsafe food. It was difficult to determine whether or not chefs were avoiding food from unsafe sources because most of the food was pre-purchased and prepared before the show was aired. However, researchers were able to observe whether or not hosts avoided foods that are considered unsafe. Although avoiding unsafe food occurred infrequently some hosts advised viewers to use food that is considered unsafe. Foods such as bean sprouts, raw oysters, raw fish, unpasteurized apple cider and kava, an herbal ingredient associated with liver toxicity, were mentioned (4). During one segment the cooking show host prepared a meal of raw oysters and raw fish for a group of young children under the age of 10. If cooking shows wish to use ingredients that could cause health problems, viewers should be made aware of the potential problems associated with foods such as sprouts and raw oysters and informed of proper handling practices including proper hand washing, refrigeration storage and prevention of cross contamination (18)

Other category. The purpose of the negative and positive other categories was to account for any noteworthy food handling behaviors not described by the other coded categories. Behaviors that fell into the negative other category included: the use of a knife as a fly swatter, hang drying ready-to-eat food on the

kitchen faucet and using teeth to squeeze a lemon. Although many of the behaviors in the negative other category are extreme, if they are practiced there is a high risk potential of food borne illness associated with many of these behaviors. The positive category included behaviors such as: hosts being scolded for double-dipping off-camera and the demonstration of the proper way to preserve food at home.

Although it is not possible to directly compare the results of this study to the results of consumer food handling behavioral studies, the common food handling mistakes observed on television are commonly made by consumers as well. This study demonstrates that the mistakes most commonly made by cooking show hosts include inadequate hand washing and cross contamination resulting from chefs failing to wash and separate equipment and failing to separate raw and ready-to-eat food. Consumer studies demonstrate that common food handling mistakes include inadequate hand washing and cross contamination from consumers failing to separate their equipment, failing to separate raw and ready-to-eat foods and inadequate cleaning of cooking utensils (8, 18). This similarity suggests that cooking show personalities are not only displaying similar food handling mistakes as consumers (their potential viewers), but there is a possibility that some consumers are developing their poor food handling behaviors based on the instructions from television cooking programs (although this cannot be determined from the present study).

CONCLUSIONS

The purpose of this study was to assess the frequency and accuracy of direct and indirect food safety messages provided by a sample of television cooking shows. Based on this limited sample of televised cooking shows, the results suggest that food handling behaviors on cooking programs could be improved. The frequency of cross contamination and lack of hand washing emphasizes this need for improvement.

Because these programs are not only a source of information but also one of entertainment, it is understood that many safe food handling practices are neglected due to time restraints or because some may feel they are less interesting to watch. For time purposes, food safety messages need not always come in the form of an observed practice. A simple reminder to wash hands after handling raw meat may be just as effective as actually performing hand washing.

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Television cooking shows as a source of food safety information

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Table 1. Coding scheme used to code for positive and negative food handling procedures in television cooking shows.

Code Themes	Code Number	Code Definition	Reference(s)
Failure to practice personal hygiene	1	Failing to wash hands under running water using liquid soap and drying hands on a paper towel/hand towel before commencing cooking or after handling raw food during cooking	(14, 18, 24)
	2	Touching or wiping face or hair with hands and failing to wash hands afterwards	(8, 24)
	3	Licking fingers or sampling food while cooking and failing to wash hands afterwards	(8, 24)
Cross contamination	4	Failing to separate ready-to-eat food from raw food	(8, 14, 15, 16, 18)

5	Use of unwashed kitchen equipment (i.e. knives, cutting boards) or inadequate washing of contaminated equipment before use	(8, 14, 15, 18, 25, 26)	
6	Failing to wash fresh fruits and vegetables for RTE meals	(8, 14, 18)	
7	Use of food after it has fallen on the floor or on contaminated counter tops	(8, 15, 18)	
Failing to keep food at safe temperatures	8	Failing to refrigerate high risk foods after sitting out for extended periods of time	(14, 16)
Failing to cook/cool food adequately	9	Recommending visual cues for doneness or failing to tell what temperature to cook food at and what temperature to cook foods to	(11, 14, 16)

Use of unsafe food	10	Advising viewer to use food (14, 18) that may possibly cause harm such as sprouts, raw oysters, unpasteurized liquids and cheeses
Other negative food handling practices	11	Any other food handling behavior that could possibly cause the food to become unsafe
Practice personal hygiene	12	Hands are washed in a sink (14, 16) under running water using liquid soap and dried using a paper towel or hand towel
Prevent cross contamination	13	Cooking utensils and (14, 16) cutting boards are washed using soap and water and dried using a paper towel or tea towel other than the one the chef carries around.
	14	Noticeable washing of fruits (14, 16) and vegetables

Keeping food at safe temperatures	15	Refrigeration of high risk foods	(14, 16)
Adequate heating	16	Demonstrating or suggesting the use of a meat thermometer during cooking to ensure doneness	(14, 16)
Other positive food handling practices	17	Observed or mention of proper food handling practices not accounted for by the coding scheme	

Table 2. Frequency of observed food handling themes in each 30-minute segment

Theme	Percentage of total observed behaviors in 2002* (N=60)**	Percentage of total observed behaviors in 2003 (N=56)
Poor personal hygiene	75.0 (45)	96.4 (54)
Cross contamination	71.7 (43)	85.7 (48)
Keeping food at unsafe temperatures	8.3 (5)	25.0 (14)
Failing to cook foods adequately	16.7 (10)	17.9 (10)
Failing to avoid unsafe food	15 (9)	14.3 (8)
Other negative	28.3 (17)	57.1 (32)
Practice personal hygiene	6.7 (4)	32.1 (18)
Prevent cross contamination	8.3 (5)	14.3 (8)
Keeping food at safe temperatures	6.7 (4)	17.9 (10)
Adequate heating	6.7 (4)	7.1 (4)
Other positives	13.3 (8)	23.2 (13)

Television cooking shows as a source of food safety information

*Percentages total more than 100% because some segments displayed more than one theme

** Actual counts in parentheses

FIGURE LEGEND

Figure 1. Frequency of observed coded categories in 2002 and 2003

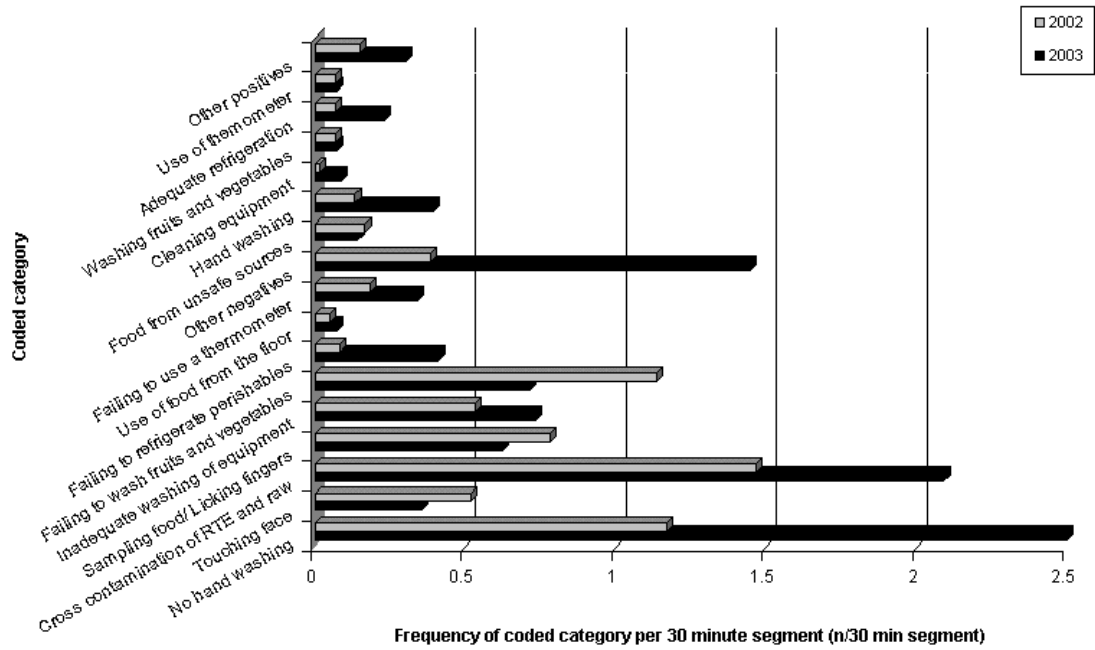


Figure 5. Frequency of observed coded categories in 2002 and 2003