



# Influence of food safety training on grocery store employees' performance of food handling practices



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## ARTICLE INFO

### Article history:

Received 31 May 2012

Received in revised form 13 May 2013

Accepted 20 May 2013

Available online 25 June 2013

### Keywords:

Food safety

Training

Employee knowledge

Employee behavior

## ABSTRACT

Food safety training is a method utilized by retail food stores to provide their managers with needed knowledge on how to prevent food borne illnesses, applying Hazard Control Analysis Critical Control Point (HACCP) principles, and help in understanding the requirements of the FDA Food Code as well as state and local food safety policies. For food safety training to be effective, employee behavior must be assessed following training in order to reduce the risks of foodborne illness. The purpose of this study was to determine the effectiveness of manager training and how this training impacted the grocery stores' performance related to hot/cold self-serve bars. Three grocery store chains were recruited and each chain selected 15 stores to be observed pre- and post-training during set-up, lunch, and tear-down of the bars. After the pre-training observation, managers from eight stores per chain attended a food safety training course (training group), while managers from the remaining seven stores received no additional training (control group). Following the training, all stores were observed to collect post-training data. The information from the observations indicated that the training did not cause a significant change in store performance for a majority of the observed categories. Many state policies only call for training and certification of managers in retail food service establishments. This study showed that it may be time for these policies to be changed to include employee training and certification as well.

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## Introduction

Americans eat almost half of their meals away from home and spend 48.9% of their food dollars on items prepared outside the home (Binkley and Ghiselli, 2005; Donga, 2011; Oregon Department of Agriculture, 2008). The U.S. Bureau of Labor Statistics reported that in 2010, Americans spent an average of \$2505 per person per year on food outside the home (Bureau of Labor Statistics, 2011). Due to this trend, many grocery retailers have aggressively changed and expanded their operations to meet customer demands. Some of these changes include offering more Ready-to-Eat (RTE) or home replacement meals (HRM) and adding salad, pizza, and coffee bars to their establishments (Food Marketing Institute [FMI], 2007). In 2010, FMI reported that 55% of grocery store shoppers were interested in RTE foods and 37% of shoppers were interested in hot/cold self-serve bars (FMI, 2010). This area

of self-service has grown rapidly in the grocery industry with sales continuing to increase and gain more popularity among consumers (FMI, 2007; Greer, 2007). Self-serve sections are now responsible for approximately \$14 billion dollars in sales per year and continue to grow at a rate of 4–4.5% annually (Kaufman and Kumcu, 2010; Progressive Grocer, 2010). The Packaged Facts research group's August 2012 study, "Prepared Foods and Ready-to-Eat Foods at Retail, 2nd Edition," forecasts the United States as having \$32.5 billion in prepared foods sales in 2012, up 7.5% from 2011.

The increase of RTE and self-serve foods has introduced new challenges related to food safety risks in grocery stores, which can lead to an increase in foodborne illnesses and outbreaks unknowingly transmitted by unknowledgeable food handlers (Binkley and Ghiselli, 2005). Foodborne illness outbreaks associated with fresh and fresh-cut produce are no longer novel, although fresh produce was once considered to be a safe food (Neal et al., 2011a,b). Fresh produce has become a prominent fixture for grocery stores not only on the cold food bars, but as part of many prepackaged meals. Changes in consumption patterns, production, processing and preparation, have also all contributed to the increase in produce-related outbreaks. With these changes, the retail foodservice industry needs to keep pace with new and effective food safety policies and training.

Abbreviations: RTE, Ready-to-Eat; HRM, home meal replacement; FMI, Food Marketing Institute; CDC, Centers for Disease Control; FDA, Food and Drug Administration; USDA, United States Department of Agriculture; SPSS, Statistical Package for Social Sciences.

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The Centers for Disease Control and Prevention (CDC) estimate that 47.8 million foodborne illnesses, 127,839 hospitalizations, and 3037 deaths occur from contaminated food each year in the US (CDC, 2012). In addition, food safety has become a top public policy issue in the US (York et al., 2008). Food service and retail stores have a significant share in the responsibility to provide consumers with safe, quality food (Food and Drug Administration [FDA], 2009b). The FDA Food Code states that for retail and food service workers to make a positive impact on foodborne illness, they must achieve active managerial control, ensure basic sanitation practices are employed, have their employees trained in food safety, and implement HACCP principles (FDA, 2009b).

Due to the increased frequency in which Americans dine out, the Environmental Health Specialists Network (EHS-Net), in collaboration with the FDA and the United States Department of Agriculture (USDA), have been working to identify how and why foodborne illness and disease outbreaks occur in foodservice (Green and Selman, 2005; Green, 2008). One study focused on comparing food handling practices and characteristics in outbreak and non-outbreak facilities to identify differences (Hedberg et al., 2006). When they examined the contributing factors for each of the outbreaks, it was found that 65% were associated with foods that had been prepared and/or handled by infected employees (Hedberg et al., 2006). The contributing factor for the remaining 35% was bare-hand contact with food. Food handler error has been associated with the top five risk factors of foodborne outbreaks in foodservice facilities as stated by the FDA. These five factors are: improper time and temperature controls, inadequate cooking, cross contamination, purchasing and receiving foods from unsafe sources (seafood markets/departments), and poor personal hygiene (FDA, 2009a).

One method for combating these food safety risks is through food safety training (Cotterchio et al., 1998), however, state policies for training and certification can vary widely. The FDA Food Code states that during any inspections and upon request managers must demonstrate knowledge of food borne disease prevention, the principles of HACCP, and requirements of the Food Code (FDA, 2009b). It further states that in addition to demonstrating this knowledge, the manager must be certified as a food protection manager that has passed the examination provided by an accredited program (FDA, 2009b). Although, some states require both the manager and employee to participate in a training and certification program while other states only require training and not certification. Certain states require a certified manager to be present at all times while the facility is open while other states only require one manager in the facility to be certified. In addition, most states only require managers to be trained, not employees (NRA, 2012).

Researchers have found that adequate food safety training of all employees can positively impact food safety in the retail food industry (Bryan, 2002; Howes et al., 1996), while others have agreed that employee training and implementation of safe food practices are essential in preventing foodborne illnesses (Cohen et al., 2001; Cotterchio et al., 1998; Kassa, 2001; McElroy and Cutter, 2004; Riben et al., 1994; Roberts et al., 2008; York et al., 2009). Even though many individuals in the foodservice industry have undergone some form of training, previous studies and outbreak data indicate there is still a problem with food safety knowledge being transferred to proper food handling behaviors (Bryan, 2002; Hume, 2004). It has also been established that it is important to assess the effectiveness of food safety training programs in order to prevent foodborne outbreaks (McNamara, 1999; York et al., 2009). The purpose of this study was to determine the effectiveness of manager food safety training as well as how this training impacted the stores' performance related to the operation and maintenance of hot/cold self-serve bars in grocery stores.

## Materials and methods

### Selection of participants

Fifteen stores for each of three grocery store chains were recruited and agreed to participate in this study. Each store permitted the researchers to perform food safety assessments and observations of managers and employees associated with the hot/cold self-serve bar section of the grocery store.

### Instruments

Three instruments (Food Safety Assessment Form, Food Safety Observation Form, and Food Safety Questionnaire) were used to collect information pertaining to food safety knowledge, practices and procedures associated with grocery store managers and employees who work in the hot/cold self-serve bar areas. The *Food Safety Assessment Form* used in this study was adapted from an assessment form used in a similar study as well as forms currently being used by local health inspectors in counties where the participating stores were located. Researchers utilized this form as a method of auditing the foodservice kitchen as well as practices dealing with food preparation. The audit form was divided into eight sections associated with the preparation, maintenance, and cleaning and sanitizing of the hot/ cold self-serve bars. Specifically each of the eight sections focused on: (1) food temperature, (2) personnel, (3) food handling, (4) food preparation, (5) facility, (6) equipment, (7) food storage, and (8) ware washing facilities. The questions in the each section were scored on how many proper procedures were followed or how many "yes" boxes were checked on the audit sheets. If a "yes" box was checked, this indicated that the proper procedure was observed and received a score of 1, and if a "no" box was checked then a deficiency was observed and received a score of 0.

The *Food Safety Observation Form* was used to record the employee practices and behaviors that were visually observed by the food safety researchers during the set-up, maintenance, and tear down the hot/cold self-serve bars. Food safety researchers visually monitored employees responsible for the hot/cold self-serve bars. Managers were responsible for informing their employees about the presence of the food safety researcher. The set-up section examined the general set-up of both the hot and cold bars as well as the soup bar. The maintenance section was divided into five subgroups: (1) category product handling, (2) utensil usage, (3) product handling category, (4) food temperature category (only applicable to stores that had a coffee bar and focused on the temperature of the cream and freshness of the coffee), and (5) employees assigned to the self-serve bars and their food safety behavior. The tear-down section included procedures used to clean and sanitize the bar and the sneeze guards as well as food labeling and storage. The observational data was scored the same as the audit data. If a "yes" was recorded for a question on the observation data then it was determined that the procedure was followed correctly. If a "no" was recorded then it was determined that a deficiency had occurred.

There were two Food Safety Questionnaires administered to the stores, one for the manager and one for the employees, and the content in each was divided into five sections. The manager and employee questionnaires contained the same food safety questions, except the manager questionnaire also included questions pertaining to the store's sales, training practices, and customer traffic. Online and paper versions as well as Spanish and English versions of the questionnaire were created to meet the needs of the stores. Though the questionnaire was primarily used to determine food safety knowledge, some demographic questions were

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