



Food allergy knowledge, attitudes, practices, and training of foodservice workers at a university foodservice operation in the Midwestern United States

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ABSTRACT

The increasing incidence of food allergies is a major concern for all foodservice operators. The purpose of this study was to examine food allergy knowledge, attitudes, practices, and training among employees working in a university foodservice operation. Results from a paper-based questionnaire showed statistically significant differences in employee knowledge, attitudes, practices, training received, and perceived training needs between student and non-student employees. While training specific to food allergies was not provided, employees considered food allergy training to be important for handling food safely in their workplace. Attitudes toward food allergies had a significant influence on food allergy practices. Results from this study can be used by university foodservice operations to develop food allergy policies and procedures by taking into account the needs of their employees to protect food allergy sufferers in university foodservice operations and promote well-being.

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1. Introduction

1.1. Foodservice industry in the United States

The foodservice industry is a major contributor to the economy in the United States (U.S.). In 2010, American consumers spent nearly \$580 million on purchasing food away from home (NRA, 2010). Food was purchased from commercial (restaurants, caterers, cafeterias) and non-commercial foodservice operations (college, universities, nursing homes). As individuals continue to become busier, it is expected that number of individuals who eat away from home will continue to increase. Every year, an estimated 9.4 million illnesses, 55,961 hospitalizations and 1351 deaths in the U.S. result from consumption of foods contaminated with known disease agents (Scallan, Griffin, Angulo, Tauxe, & Hoekstra, 2011b). An additional 38.4 million illnesses, 71,878 hospitalizations and 1686 deaths are estimated to result from consumption of foods contaminated with unspecified agents (Scallan, Griffin, Angulo, Tauxe, & Hoekstra, 2011a). It is estimated that annually foodborne illnesses in retail foodservice operations costs consumers \$6 billion in healthcare costs and loss of productivity. Food consumed at retail foodservice establishments, commercial and non-commercial

sectors remain an important source for outbreaks of foodborne disease. With the increasing numbers of customers that are dining out, protecting food from all types of contamination (intentional and unintentional) is critical to the success and survival in the foodservice industry. The changing demographics of the U.S. foodservice industry is one of the major challenges that is impacting food safety (Sneed & Strohbehn, 2008). The U.S. foodservice industry is constantly changing and foodservice establishments need to be prepared for these changes.

1.2. Food allergies

Food allergies affect approximately 15 million Americans and are a growing public health concern in the U.S. (FAAN, 2010). A food allergy is an abnormal response of the immune system to proteins in certain food items (Burks, Helm, Stanley, & Bannon, 2001). Although food allergy symptoms are mostly minor, such as rashes, itching, and swelling; some allergic reactions are much more severe and can cause anaphylactic shock and possibly death (Sampson, 2004). Eight foods cause approximately 90% of reported reactions: milk, eggs, fish, shellfish, wheat, tree nuts, peanuts, and soybeans (FAAN, 2010). It is estimated that every year, food allergies are responsible for roughly 30,000 medical emergencies and 150–200 deaths in the U.S. (Sampson, 2004). Reports of fatal reactions from food allergies indicated a high proportion of the affected group were teenagers and young adults (Bock, Munoz-Furlong, & Sampson, 2001) perhaps because adolescents and young adults are

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more inclined to engage in risk-taking behaviors related to food allergies (Bock et al., 2001) and 2.3% of teenagers in the U. S. have a food allergy (Pereira et al., 2005).

A study conducted from 1994 to 2004 by Bock, Munoz-Furlong, and Sampson (2007) showed that 16 food allergy-related fatalities out of 63 involved college-age students and 50% of those incidents took place on college campuses. College students with food allergies faced risks when eating at college and university dining establishments because colleges and universities were often not well equipped to meet the needs of students with food allergies (Greenhawt, Singer, & Baptist, 2009) and had none or unclear policies and procedures for allergen handling (Rajagopal & Strohhahn, 2011). In a survey of college students, Monaco, Rajagopal, and Bernstein (2012) found that students would like to see more allergen-free meal options, easy to view/read food allergy labels, and receive information about food allergy accommodations during campus orientations. Food allergies are considered a disability under U.S. federal laws such as Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992 (U.S. Department of Education, 2009), hence foodservice operations are required to provide accommodations for their food allergic customers.

All foodservice employees bear the responsibility of ensuring that the food served to their customers is safe, particularly, foods prepared and served to patrons with food allergies. However, there are few studies related to the food allergy knowledge, attitudes, practices, and training of foodservice workers in college and university dining settings. The purpose of this study was to examine food allergy knowledge, attitudes, practices, and training among college and university dining employees. Findings will be helpful in developing food allergy training specific to college and university dining settings and development of policies and procedures to protect patrons with food allergies.

2. Material and methods

2.1. Research design

A paper-based questionnaire based on guidelines by Dillman, Smyth, and Christian (2007) was developed after an extensive review of literature related to food allergies. This study was carried out at a large-sized university (enrollment of 32,000 students) in a suburban setting in the Midwestern U.S. The questionnaire was reviewed by three individuals with expertise in food safety and foodservice operations to establish content and construct validity. The questionnaire was then administered to students ($n = 42$) in an undergraduate food safety class to determine face validity. The questionnaire was modified and distributed to a convenience sample of foodservice employees working in university dining. Data was collected by visiting various foodservice establishments during different shifts to avoid sampling bias. Managers provided consent to access the establishments and distribute the questionnaires. After obtaining permission, questionnaires were given to the managers for distribution at the beginning of the work day and picked up at the end of the same day or returned by campus mail. As a token of appreciation, respondents were included in a drawing to receive \$5 gift cards as an incentive. The questionnaire and research protocol was approved by the University Human Subjects Institutional Review Board (IRB) prior to data collection.

2.2. Questionnaire design

The questionnaire consisted of five sections. The first section contained 11 multiple-choice questions that measured employees' food allergy knowledge. Correct responses were coded as 1 and

incorrect responses as 0. The second section contained 14 items that assessed employee attitudes toward food allergies and handling customers with food allergies using a 5-point Likert scale, ranging from one (1) "Strongly disagree" to five (5) "Strongly agree". The third section contained 11 items that assessed the frequency of specific food allergy practices in their workplace using a 3-point Likert scale ("1 = Never", "2 = Sometimes", "3 = Always").

The fourth section consisted of a screening question to identify those employees who had received training specific to food allergies and allergen handling, either during employee orientation or on-the-job. A response for training received was coded as 1, while no training received was coded as 0. Respondents who had never received food allergy training were asked to skip section four and only respond to the fifth section. In the fifth section, respondents rated their perceived food allergy training needs using a 5-point Likert scale ranging from one (1) "Very unnecessary" to five (5) "Very necessary". The five items related to training were developed based on the Food Code (FDA, 2009). The final section consisted of demographic questions.

2.3. Statistical analysis

Questionnaires were hand coded and data was analyzed using Statistical Package for Social Sciences (SPSS) version 19.0. Descriptive statistics and Cronbach's coefficient of reliability were calculated. One-way analysis of variance (ANOVA) and independent *t*-test were used to examine significant differences in food allergy knowledge, attitudes, practices, training, and perceived training needs based on respondents' characteristics and work status (student/non-student employees). For unequal variances between groups, Welch test was conducted and *F*-test was conducted when there were equal variances between groups. Games–Howell or Bonferroni post-hoc tests were conducted to determine within group differences. Pearson correlation coefficients were calculated to examine relationships among subjects' knowledge, attitudes, practices, training, and perceived training needs. Multiple linear regression analysis was used to test which variable among knowledge, attitudes, and training had the greatest effect on practice.

3. Results

3.1. Demographic characteristics

Two hundred and sixteen respondents returned the questionnaire, of which 23 questionnaires that were incomplete or improperly filled were excluded, resulting in 193 useable questionnaires. Table 1 shows the demographic characteristics of respondents.

3.2. Food allergy knowledge, attitudes, practices, and training of employees

Respondent responses to food allergy knowledge items are shown in Table 2. The mean knowledge score was 8.62 ± 1.95 (out of 11 possible points). The Cronbach's coefficient of reliability was 0.64. Respondents were knowledgeable when asked about the definition of food allergy (96.4%) and what service staff should do to prevent an allergic reaction (91.7%). On the other hand, respondents were less knowledgeable when asked to identify common food allergens (46.4%) from a given list and the best treatment for controlling a severe food allergy reaction (58.0%).

Attitudes of respondents toward food allergies and customers with food allergies are shown in Table 3. The mean score for

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