
Food-allergy management from the perspective of restaurant and food establishment personnel

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Background: Restaurant and food establishment dining poses dangers for food-allergic consumers.

Objective: To identify, from the restaurant's perspective, factors that affect providing allergen-safe meals.

Methods: A structured questionnaire was administered to a convenience sample of restaurant personnel.

Results: Participants included 100 individuals (42 managers, 32 servers, 24 chefs, and 2 others) in 100 establishments (48 restaurants [17 continental, 19 Asian, and 12 Italian], 18 fast food, and 34 take-out [8 bakery, 13 ice cream, 9 Asian, and 4 pizza]). Food-allergy training was reported by 42% (76% apprenticing and 24% set program). On a 5-point Likert scale, a rating of "very" or "somewhat" comfortable was selected by 72% for providing a safe meal, 70% for "guaranteeing" a safe meal, and 47% for managing a food-allergy emergency. Regarding knowledge questions, 24% indicated that consuming a small amount of allergen would be safe, 35% believed that fryer heat would destroy allergens, 54% considered a buffet safe if kept "clean," and 25% thought that removing an allergen from a finished meal (eg, taking off nuts) was safe. More than 80% recognized peanut, milk, and seafood as major allergens (61% recognized egg). In practice, 58% indicated having a plan in place in the event of a reaction, and 62% had a plan to provide safe meals. An interest in further training was expressed by 61% of participants.

Conclusions: The restaurant personnel surveyed expressed a relatively high comfort level in providing safe meals to allergic consumers, but there are deficits in their knowledge base, indicating the need for more training and consumer caution.

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INTRODUCTION

Food allergies are common and seem to be increasing. Obtaining allergen-safe meals from restaurants and other food establishments is time-consuming and prone to errors, with a significant toll on patients' and families' quality of life.^{1,2} In a registry of persons with peanut and tree nut allergies, reactions in restaurants accounted for up to 25% of unintentional exposures.³ In a registry of fatal reactions to foods,⁴ 15 of 32 reactions began from food obtained in a restaurant or other food establishment. There is only one study,⁵ to our knowledge, that specifically addresses allergic reactions in restaurants, and that study was directed at families with peanut or tree nut allergy. Various errors were disclosed by the families, such as poor communication about the allergy, cross-contact of foods, and errors in food preparation. There have been no studies about food allergy from the perspective of the food establishments. We conducted the present study to determine, from the perspective of restaurant personnel, their comfort and knowledge levels in providing safe meals to food-allergic consumers with the goal of identifying rectifiable deficits and gaining insight into the need for and modalities for educational interventions.

METHODS

Questionnaire

A 19-question survey was devised to address demographic features of respondents and their food establishments (8 questions), comfort with providing meals and taking action in the event of a reaction (3 questions), food-allergy knowledge (6 questions), and educational preferences (2 questions). Questions were based, in part, on results of previous studies,⁵ a program available to train restaurant personnel about food allergies (the Food Allergy Training Guide for Restaurants and Food Services; <http://www.foodallergy.org>), and the personal experience of the investigators. The form was also intentionally brief to promote successful completion. The questions were piloted and revised during face-to-face interviews ($n = 25$) with restaurant personnel to address clarity and content. Comfort level was rated on a 5-point Likert scale: very comfortable, somewhat comfortable, comfortable, somewhat uncomfortable, and very uncomfortable.

Interviews of Restaurant Personnel

A convenience sample of restaurants and food establishments was obtained using the New York City/Long Island yellow pages and *New York Magazine* restaurant guide, aiming for 100 participants. Food establishments were selected to survey a broad range of food provider types (sit-down restaurants, fast food, and take-out) and ethnic fare. The person answering the telephone was asked to identify the person who may have responsibility in the restaurant (eg, a manager/owner or server or chef). Each participant was then informed about the nature of the call and the study. No names or other identifying information was obtained. After the survey was completed,

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no link of the data to the specific telephone number was maintained. If a person of responsibility was not available, a callback time was determined.

Statistical Analysis

Categorical variables were analyzed using the χ^2 test, and relationships were assessed using the Spearman correlation. $P < .05$ was considered statistically significant.

RESULTS

Demographics, Allergy Awareness, and Training Experiences

Of 143 food establishments contacted, 70% participated; all nonparticipants simply refused. The demographic features of the respondents and their food establishments and previous training are summarized in Table 1. On average, respondents estimated that few patrons have food allergy (0.3%); however, 26% of the restaurants estimated that 1% to 2% of their customers have food allergy (a value that matches population estimates). Of the respondents indicating 1% to 2% notification of allergy, 45% were sit-down and 35% were fast food. Training was primarily through “one-on-one” sessions (apprenticing) (76%) rather than a set program (24%). Only 1 respondent recalled an allergic reaction occurring in the preceding year, but 16% were unsure.

Comfort in Providing Allergy-Safe Food and Managing an Emergency

Comfort ratings are shown in Figure 1. There were no significant differences among managers, servers, and chefs regarding comfort in providing a safe meal or handling an allergy emergency ($P = .35-.95$). However, regarding “guaranteeing” a safe meal, managers (54%) were less likely than chefs (79%; $P = .047$) or servers (78%; $P < .007$) to feel very or somewhat comfortable doing so. Across the study group there was no correlation between comfort and reported previous training ($P = .84$).

Knowledge About Food Allergy

The results of food-allergy knowledge questions are given in Table 2. Rates of correct responses did not vary significantly among managers, servers, and chefs (data not shown). Only 46% of respondents who recognized milk as a major allergen also recognized the term *casein*. Considering the 5 true-false questions, only 22% of participants selected the correct response for all of them. Number of correct responses was not associated with comfort level for providing or guaranteeing a safe meal ($P > .9$).

DISCUSSION

This is the first study, to our knowledge, to address the issue of food allergy from the perspective of personnel in restaurants and food establishments. In surveying a convenience sample of various types of food establishments in New York, and in including several different occupations in these restaurants, we found that the comfort level in managing food allergy exceeded the knowledge base. Many respondents did

Table 1. Demographic Features of 100 Respondents and Their Food Establishments and Training Preferences

Feature	Value
Type of food establishment, No.	
Sit-down restaurant	48
Continental	17
Asian	19
Italian	12
Fast food	18
Take-out	34
Bakery	8
Ice cream	13
Asian	9
Pizza	4
Position of respondent, No.	
Manager	42
Server	32
Chef	24
Other (nutrition advisor or host)	2
New hires each year, mean (range), No.	5 (0–30)
Customers (past month) who indicated a food allergy, mean (range), %	0.3 (0–2)
Plan in place to handle a food allergy emergency, %	
Yes	58
No	24
Unsure	18
Plan in place to provide a safe meal, %	
Yes	62
No	26
Unsure	12
Previous food-allergy training, %	
Yes	42
No	52
Unsure	6
Interest in future training programs, %	
Yes	61
No	22
Unsure	17
Would recommend certification and regulation of food-allergy training, %	
Yes	55
No	24
Unsure	21

not recognize that small amounts of a food can trigger a reaction, did not know that heat may not destroy allergens, and did not recognize common means of cross-contact of foods. Because there was no correlation of knowledge about these issues with comfort level in meal provision, the potential for danger is presumably increased because food providers could present a false sense of security to consumers.

In a previous study⁵ of allergic consumers, we identified several pitfalls regarding providing safe food in restaurants for persons with peanut or tree nut allergy. Poor communication about the allergy and errors such as cross-contact (shared equipment) and hidden ingredients (eg, a server who did not know and did not check ingredients) were common causes of reactions. The potential errors were verified in the

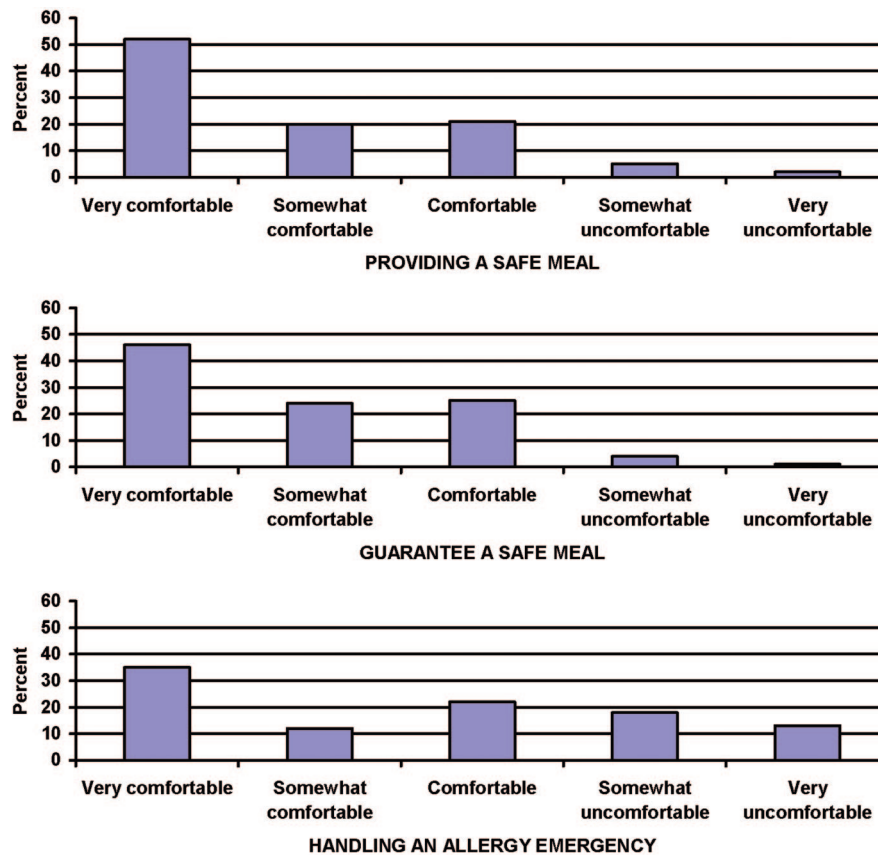


Figure 1. Comfort level of respondents regarding serving food-allergic consumers.

present study based on the lack of formal training about food allergy, the high perceived understanding of the needs of food-allergic consumers, and the errors on knowledge questions. The results of this study underscore an important public health issue: the need for allergic consumers to be wary of deficiencies and potential errors and for the food industry and regulators to promote education about food allergy for food service.

Currently, there are no national requirements for comprehensive education about food allergy for food providers in restaurants and similar establishments; however, some states require educational programs. The Food and Drug Administration produces the Food Code (<http://www.cfsan.fda.gov/~dms/foodcode.html>), which contains guidelines for retail food operations that are not mandatory but that may be adopted as a guideline or required for use by state legislation. In September 2005, food allergens were mentioned for the first time in the Food Code, and there is a requirement that restaurant managers be able to “describe foods identified as major allergens and the symptoms that a major food allergen could cause in a sensitive individual who has an allergic reaction.” This study confirms the need for education to potentially increase the safety of consumers.

This study also identified potential barriers to education for restaurant personnel. First, a high rate of turnover of staff was identified, which means that education about food allergy would need to be repeated for new hires and reviewed. Second, a disappointing number of respondents, 39%, were not interested or were unsure whether they would be interested in training programs. Furthermore, only a narrow majority, 55%, believed that certification of food-allergy education should be pursued. These opinions about the need for education and certification, combined with high turnover of staff and a lack of correlation between knowledge and comfort, indicate that numerous potential obstacles must be overcome to achieve increased education for food service employees.

The information in this study is pertinent to the allergist and the allergic consumer. The results indicate that at this time the food-allergic consumer must exercise extreme caution and not assume that most restaurants are safe or that food preparers are well-versed in issues of food allergy. The consumer should review potential pitfalls (eg, cross-contact) and ensure that persons preparing the foods are aware of these. In addition, food preparers should know that the consumer has an allergy and that a trace amount of the food could be

Table 2. Results of Food-Allergy Knowledge Questions

Question	Agree with statement, %			
	Managers/owners	Servers	Chefs	Total
Individuals with food allergies can safely consume the foods that cause the allergies if only a small amount is consumed	24	19	33	24
High heat (eg, oil frying) can destroy most food allergens	36	31	42	35
If an individual is having an allergic reaction, it is appropriate to serve them water to "dilute" the allergen and suppress the reaction	40	28	33	34
If a buffet (self-serve) counter contains allergens but is kept clean it can be a safe choice for a food-allergic patron	57	47	58	54
Removing an allergen from a finished meal (eg, taking off nuts) may be required to provide a safe meal for a food-allergic patron	24	25	29	25
Selected the following as "major allergens"				
Peanut	95	94	88	93
Seafood	83	81	83	82
Milk/dairy	83	81	79	82
Chocolate	71	66	83	72
Egg	57	63	63	61
Casein	48	38	38	42
Strawberry	17	13	13	14
Carrot	19	9	8	13
Tomato	10	9	13	10
Orange	12	6	13	10

problematic. Persons who know the ingredients in the foods at the time of purchase should also be involved in the process.

This study has certain intrinsic limitations. We tried to obtain a cross-section of types of restaurants so that we would have the advantage of a broad experience. In doing so, we could not determine whether certain types of establishments had more problems than others either because of intrinsic issues (eg, differences between "mom and pop" restaurants and chains) or because of different use of allergens according to cuisine, but presumably this could be the case. For example, regarding peanut allergy, Asian restaurants, bakeries, and ice cream parlors were more commonly problematic for consumers based on a previous study.⁵ A larger comparative study would be needed to discern such differences among types of restaurants. Another limitation is that the respondents were providing retrospective information for some questions, and not every worker in the restaurant was interviewed. This may have led to underreporting of consumer requests for allergy-safe meals and reactions. However, to overcome this limitation would require "real-time" monitoring of consumer experiences in the restaurant. Another limitation is that persons could have been biased toward presenting a "positive" outlook. We tried to limit this possibility by ensuring anonymity. Considering the high rate of responses indicating opposition to further educational efforts, it seems unlikely that a strong bias was present. It is not known whether the low number of allergic reactions reported by the participants reflects lack of communication of reactions by

patrons, lack of awareness by staff, lack of communication among staff, or a combination of these factors. Last, English-speaking persons answered the telephone, and the extent of language barriers was not evaluated.

In conclusion, to our knowledge, this is the first study to consider issues of food allergy from the perspective of restaurants and food establishments. We identified deficits in the knowledge base and potential barriers to education that must be addressed. We suggest that legislators, consumer groups, the industry, and government agencies work together toward creating policies and educational programs to increase food-allergy awareness in the restaurant industry, possibly through legislative action toward required education. Additional studies are needed to validate educational programs. In the meantime, physicians must educate patients about potential pitfalls and how to increase the safety of meals they obtain through point-of-purchase communication and education about their food allergy.

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