

1 **'Food allergy? Ask before you eat': Current food allergy training and future training needs** 2 **in foodservice**

3 4 **Abstract**

5 The incidence of allergic reactions to food occurring in eating out situations is becoming increasingly
6 prevalent amongst susceptible consumers. Previous studies repeatedly identified food allergy
7 knowledge gaps among foodservice staff. This highlights the importance of food safety and food
8 allergy training in foodservices to minimise risk of food allergic reactions. This study aims to
9 determine the current food allergy training practices, challenges and future food allergy training
10 needs of foodservices in England. A postal survey was conducted among 500 foodservice operators in
11 North West England. The questionnaire is divided into 5 sections: (i) demographics; (ii) current food
12 allergy training practices; (iii) importance of food allergy training topics; (iv) challenges faced by
13 restaurants when training foodservice staff; and (v) future food allergy training. Out of the 30
14 restaurants, only one restaurant did not carry out food allergy training. More than 70% of the
15 restaurants frequently trained newly hired staff and whenever changes or updates occurred in the
16 food hygiene regulations (60%). Most of the training were on-the-job training and took between 1 –
17 2 hours to complete. Identification of food allergens in menu, prevention of cross contact and
18 communication were identified as the most important topics in food allergy training. High staff
19 turnover and lack of time contributed to the difficulty in training foodservice staff. There was
20 considerable interest in the types of future food allergy training and most preferred on-site training by
21 authorised staff or training at local councils. Further work is needed in the evaluation of future food
22 allergy training needs to develop effective training materials and delivery methods to ensure the
23 safety of food allergic individuals.

24
25 **Keywords:** challenges; communication, food allergy, online training, on-site training, restaurants

26 27 **Highlights:**

- 28 • Most food allergy training was conducted using a one-to-one, on-the-job training approach
- 29 • High staff turnover and lack of time contributed to the difficulty in training foodservice staff
- 30 • Communication, prevention of cross contact and identifying food allergens were key topics
- 31 • Restaurants felt that the responsibility for food allergy training lay with the local council
- 32 • Face-to-face or on-site training was preferred to online learning

33 34 **Introduction**

35 Up to 20% of fatal anaphylactic reactions in England and Wales occurred in eating out situations. Out
36 of the 124 deaths attributed to the consumption of food allergens in 1992 to 2012, 25 fatalities
37 happened in restaurants (Turner et al. 2015). A US study conducted by Wanich, Weiss, Furlong, &
38 Sicherer (2008), highlighted that of the 294 respondents recruited, 34% experienced at least one

39 food allergic reaction at a restaurant. Likewise, in another study conducted by Weiss and Munoz-
40 Furlong (2008), it was further highlighted that almost 50% of fatal food allergic reactions over a 13-
41 year period, were caused by foods consumed at multiple different restaurants. A recent example
42 exemplifies such fatal reactions.

43 The Byron Burger death inquest was featured in the UK news in September 2019. Owen Carey,
44 an 18 year old boy, died from a fatal reaction upon eating a dish marinated with buttermilk.
45 Carey told staff about his milk allergy and checked the menu. The menu did not mention
46 anything about marinade in his dish, hence was reassuring to Carey that his order did not
47 contain milk. It is a legal requirement for allergy information to be made available and signage
48 supporting this to be visible in a catering environment. At the bottom of the Byron menu,
49 allergy information were provided but in very small font, with black print on a royal blue
50 background (BBC, 2019). So, what happened during the communication between Carey and
51 the staff? Do frontservice staff communicate with kitchen staff if unsure of a particular menu?
52 Are staff trained appropriately in food allergy and food allergen management training? Much
53 research supports the increased likelihood of being exposed to food allergens when eating
54 outside of home (Radke et al., 2016; Barnett, Begen, Gowland, & Lucas, 2018; Ortiz et al.,
55 2018; Soon, 2018). Each year in the UK, 10 patients die from food-induced anaphylaxis (FSA,
56 2020). Peanuts are one of the top 10 foods responsible for the majority of food allergies in the
57 United Kingdom (UK). Other major food allergens include milk, eggs, tree nuts, fish and
58 shellfish (NHS, 2019). Recent fatalities due to presence of food allergens in commercial meals
59 underscore the importance of food allergy knowledge and practices among foodservice staff
60 (BBC, 2018; BBC, 2019).

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62 Numerous studies on food allergy knowledge, attitude and practices among food handlers have been
63 carried out. Studies such as those conducted in Turkey (Sogut et al., 2015), US (Dupuis et al., 2016;
64 Lee & Sozen, 2018), UK (Bailey, Albardiaz, Frew, & Smith, 2011; Common et al., 2013) found food
65 allergy knowledge gaps among restaurant workers. In Sogut et al. (2015), out of 351 staff who
66 responded, only 54.3% were able to recognise at least 3 food allergens and 12.1% gave correct
67 answers to the true and false food allergy knowledge questions. Only 17.1% of the staff received
68 food allergy training (Sogut et al., 2015). Dupuis et al. (2016) found that the majority of the
69 restaurant employees (53.7%; n=187) could only name up to one preventive measure in reducing
70 risk of food allergy. Only one in six restaurant workers correctly identified the two most important
71 steps when responding to an anaphylactic reaction (i.e. administration of epinephrine and calling the
72 emergency helpline) (Dupuis et al., 2016). In Lee and Sozen (2016), 36.7% (n=229) had received
73 food allergy training in the past year while 20% received the training when they were newly hired.
74 Most foodservice employees were not trained in food allergy, although they expressed interest to
75 participate in such training (Lee & Sozen, 2016). Common et al. (2013) also found that although the
76 majority of restaurant staff (90%; n=80) received food hygiene training, only 15% received food

77 allergy training. In McAdams, Deng, & MacLaurin, 2018 and Radke et al. (2016), the studies revealed
78 that most participants were knowledgeable about food allergies and appreciated their role in
79 providing safe food to consumers. However, the participants expressed a lack of food allergy risk
80 management resources and training (MacAdams et al. 2018). Participants' food allergy knowledge
81 was acquired through informal one-to-one sessions, generic food safety training and first-aid courses
82 rather than programmes tailored to food allergy training (McAdams et al., 2018). A face-to-face food
83 allergy training programme was conducted among restaurant staff in the UK and the study reported
84 an increase on participants knowledge of food allergy from 82% (before training) to 94% (post-
85 training) (Bailey, Kindratt, Smith, &fare Reading, 2014). Although the number of participants were
86 low (n=11), Bailey et al. (2014) identified that face-to-face training may be difficult for foodservice
87 staff to attend due to the opportunity costs for the restaurant and staff's time. Bailey et al. (2014)
88 also suggested that online food allergy training is an alternative and could potentially reach wider
89 audience especially among workers working outside the standard hours. The Food Standards Agency
90 UK (FSA) has developed an interactive food allergy training that is targeted primarily for local
91 authority enforcement officers but is freely accessible for anyone interested (FSA, 2019). The online
92 training would clearly benefit restaurant managers and owners and could be used as materials to
93 train their staff.

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95 The above studies identified clear food allergy knowledge gaps among restaurant workers and
96 highlighted the need for greater training of foodservice staff. The Byron Burger incident further
97 reiterates to what extent food allergy training are provided to foodservice staff. Thus, this study aims
98 to determine the current food allergy training practices, challenges and future food allergy training
99 needs of foodservices in England.

100

101 **Methodology**

102 The questionnaire was constructed and divided into sections: (i) demographics; (ii) current food
103 allergy training practices; (iii) importance of food allergy training topics; (iv) challenges faced by
104 restaurants when training foodservice staff; and (v) future food allergy training (available in
105 supplementary material). A pilot study was conducted at the author's university canteen to ensure
106 clarity and suitability of wording. The study was reviewed and approved by the university's Science,
107 Technology, Engineering, Medicine and Health (STEMH) ethics committee (STEMH 840). Five hundred
108 foodservice operators based in north-west of England were contacted using the FSA's food hygiene
109 ratings advanced search options. Specific search terms such as 'Restaurants' under 'business type' and
110 'cities or large towns' based in local authorities of the five counties (Cheshire, Merseyside, Greater
111 Manchester and Lancashire) were selected. Systematic sampling using the FSA hygiene rating list was
112 carried out to ensure restaurants with hygiene ratings of 0 – 5 stars were selected. The breakdown of
113 restaurants according to hygiene ratings assigned by FSA were as follow: 5 stars (n=311), 4 stars
114 (n=106), 3 stars (n=54), 2 stars (n=15), 1 star (n=13), 0 (n=1). The restaurants were sent a postal

115 survey containing the study information sheet, consent form, questionnaire and a postage paid return
116 envelope. Restaurant managers, owners and supervisors were invited to participate in the study and
117 were asked to return their signed consent form and the questionnaire.

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119 **Results**

120 Thirty restaurants participated in the study. All participating restaurants indicated a hygiene rating of 5
121 (very good hygiene standards). Most of the respondents were owners (56.7%) of the restaurants and
122 50% of the participants had more than 5 years of working experience in the current restaurant. Half of
123 the participants had patrons with food allergies visiting their restaurants. More than 85% of the
124 restaurants cater to food allergic and intolerant customers whilst one restaurant was in the midst of
125 planning to cater to food allergic customers (Table 1).

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127 Insert Table 1 here

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129 Out of the 30 restaurants, only one restaurant did not conduct food allergy training. The same
130 restaurant reported that the training was only conducted when a complaint was received. More than
131 70% of the restaurants trained newly hired staff and whenever changes or updates occurred in the
132 food hygiene regulations (60%). Whilst 26.7% and 23.3% trained the staff annually or when changes
133 had been made to the menu, change of suppliers and raw materials. The Most training was on-the-
134 job training and took between 1 – 2 hours to complete. 36.7% were trained in using adrenaline auto-
135 injector whilst 20% believed that the procedure should be included as part of the food allergy training
136 (Table 2).

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138 Insert Table 2 here

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140 Topics in food allergy training

141 The top three topics that were ranked as most important by the majority of the restaurants (66.7%)
142 were identification of food allergens in menu, avoiding cross contact and communication with
143 customers about food allergies. Although the identification of the 14 main food allergens were
144 deemed important (60%), nevertheless, some of the restaurants may not be using all or most of the
145 14 food allergens. Communicating with other kitchen staff about food allergies (56.7%), responding
146 to a food allergic reaction (53.3%), reading ingredient list (50%) and recognising symptoms of food
147 allergic reactions (50%) were ranked lower by half of the participating restaurants.

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149 Types of challenges faced by restaurants when training foodservice staff

150 High staff turnover rate (58.4%) and lack of time (57.7%) remain the most challenging issues faced
151 by foodservices, followed by lack of technical expertise (48%), keeping up to date with food
152 regulatory requirements (46.2%), lack of interest from staff (32%) and language barrier (26.9%).

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Food allergy training and future interests

Most of the participants were aware of the free online food allergy training provided by FSA UK and 40% of them had taken advantage of the online training. Those who did not participate provided reasons such as the following:

Participant 8: I'm confident in delivering food safety and allergen management training.

Participant 17: I have sufficient knowledge within the company to provide my own training.

Participant 23: We did not attend FSA training because we have external staff conducting the training.

Most restaurants (86.7%) were motivated to learn more about food allergy training and prefer to receive on-site training (66.7%) or free food allergy training at local councils (60%) (Table 3).

Insert Table 3 here

Discussion

Food allergy training topics

Identification of food allergens in menu, prevention of cross contact and communication were identified as the most important topics in food allergy training. The ability to identify food items that contain food allergens can impact the safety and dining quality of food allergic and intolerant customers. One of the factors leading to Owen Carey's death may have been caused by a lack of awareness that the ordered dish contained milk (BBC, 2019). Avoiding cross contact with food allergens such as milk whilst preparing a milk-free dish is key to avoiding allergic reactions to food.. Food allergens could be inadvertently transferred to other food products that do not contain the allergens, equipment or surfaces (FARE, 2019). Previous news reports had highlighted the higher likelihood of cross contact at foodservices resulting in serious threats to individuals with food allergies (Marsh, 2018; Morgan, 2018; Ward, 2019). Radke et al. (2016) identified that few restaurants had dedicated equipment for preparing allergen-free meal thus increasing the likelihood of potential cross contact. Whilst foodservices provide a means of convenience for consumers, foodservices are often faced with constraints such as limited kitchen space, sharing of equipment, and time constraints thus highlighting the ease through which cross contact of food allergens can take place (Soon, 2018). Previous studies also reveal that communication of dietary requirements is the responsibility of consumers (Lee & Sozen, 2018; Soon, 2018; Wen & Kwon 2019). Wen & Kwon (2019) further reported that the majority of foodservice staff had never or seldom asked customers if they had any

191 food allergy. Consumers need to be vigilant and should clearly communicate their food allergies and
192 dietary requirements to staff or request to speak to the chefs. Barnett, Vasileiou, & Lucas (2020),
193 Kwon & Lee (2012) and Leftwich et al. (2011) revealed that failures in communication between
194 consumers and staff had led to a significant number of food allergic reactions whilst eating out. This
195 study reiterates Pratten and Towers (2004) who identified communication as a key problem between
196 customers and frontservice staff.

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198 Challenges in food allergy training

199 High staff turnover and lack of time contributed to the difficulty in training foodservice staff. High
200 employee turnover has always been a challenge in the food and hospitality sector (Goh & Okumus,
201 Goh & Lee, 2018). Lack of career opportunities (Stamolampros, Korfiatis, Chalvatzis, & Buhalis,
202 2019), job burnout, having a young and often transitory workforce (Lu & Gursoy, 2016) and long
203 working hours (Butler, & Hammer, 2018) had been identified as important predictors of employee
204 turnover. Foodservice workers are also more likely to leave their positions than to raise the issues
205 with their current employer (Kik et al., 2019) and have often viewed the foodservices as stopgap until
206 better opportunities came along (Butler, & Hammer, 2018). As working hours are long and
207 demanding, this has led to very little time committed to training. For example, Witts (2017) identified
208 that more than 1 in 10 chefs in London work for more than 60 hours per week while managerial staff
209 who had been contracted to work for 44 hours per week were actually spending up to 70 hours in the
210 fast food restaurant sector (Butler, & Hammer, 2018). The lack of time to conduct training in
211 foodservices is mirrored in the food industry where the biggest barrier to food safety training is the
212 inability to schedule time for training. A Global Food Safety Training Survey revealed that more than
213 450 food and drink producers worldwide (out of 649) struggled to find time to train their employees
214 in food safety practices (Food Safety News, 2013).

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216 Future food allergy training

217 There was considerable interest in the types of future food allergy training and most preferred on-site
218 training conducted by authorised staff or training at local councils. The participating restaurants felt
219 that the responsibility for food allergy training lay with the local council. This mirrors Pratten and
220 Towers (2004) findings where the majority of the interviewees suggested that the training
221 responsibility lies with the Department of Environmental Health. Contrary to expectations, this study
222 revealed that face-to-face or on-site training was preferred to online learning. A possible explanation
223 for this result is that foodservices rely on practical, hands-on skills to ensure the preparation and sale
224 of safe and quality food. Foodservices staff often work with unpackaged food, equipment and utensils
225 and any mishandling can lead to serious health implications such as foodborne illnesses (McFarland,
226 Sielaff, Rasco, & Smith, 2019) or food allergic reactions. Similar to food safety training practices such
227 as using a thermometer correctly to ensure food has reached the appropriate temperature and proper
228 handwashing techniques, managing food allergens on-site requires on-site training to understand

229 how food allergens will be stored, segregated, labelled and handled. Husain, Muda, Jamil, Hanafi &
230 Rahman (2016) used hands-on demonstrations for delivering handwashing information and allow
231 participants to self-practice on-site leading to a significant improvement in personal hygiene. Howton
232 et al. (2016) suggested that a blended style of online learning (combination of delivery methods that
233 best fit the needs of learner) and taught at middle school reading level is the most effective and
234 desired delivery method in the study. Topics such as responding to a food allergic reaction, reading
235 ingredient list and recognising symptoms of food allergic reactions were perceived as less important
236 by the participating restaurants. Further research should be carried out to explore why such topics
237 were considered less relevant as lack of training in such topics could lead to serious health
238 implications.

239

240 Limitations

241 The very low response rate, small sample size (n=30) and self-reported practices remain major
242 limitations of this study. The low response rate could also be due to the lack of time and demanding
243 job requirements of foodservice staff. Although 500 restaurants were invited to participate in the
244 study, only 30 restaurants participated and this may indicate significant bias. All participating
245 restaurants indicated a food hygiene rating of 5 and may represent a motivated group of restaurants
246 that are interested in food safety and food allergy topics. Thus, the results should be treated with
247 caution as non-participating restaurants may have different training needs and interests. Since the
248 study was based on self-reported practices, there is a possibility of social desirability bias from the
249 participating restaurants. Much more work is needed in the evaluation of future food allergy training
250 needs to develop effective training materials and delivery methods to ensure the safety of food
251 allergic individuals.

252

253 Conclusion

254 This study identified the current food allergy training practices of restaurants and the type of training
255 that appeals to them. The findings also reiterated important gaps in foodservices in relation to food
256 allergy training. The main challenges in training were identified as lack of time to schedule training
257 and high staff turnover. Self-paced online training that's certified by authorised authority may be an
258 alternative to foodservice staff especially if restaurants are struggling with high staff turnover and
259 time constraints. The study also offers insights into some of the key topics in food allergy training and
260 the potential to incorporate the correct administration of adrenaline auto-injector in food allergy
261 training. This may offer the potential to decrease the incidence of fatal food-induced anaphylactic
262 reactions. A greater focus on the food allergy training needs of specific learners (e.g. chefs, kitchen
263 staff, front service staff) could produce relevant findings to improve the training content and its
264 approaches.

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