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Eating out with a food allergy in the UK: Change in the eating out practices of consumers with food allergy following introduction of allergen information legislation

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Abstract

Background: Strict allergen avoidance is important in day-to-day management of food allergy and avoidance when eating outside the home can present particular difficulties. EU legislation (EU FIC) introduced in December 2014 aimed to improve food allergen information provision for customers by requiring retailers of non-prepacked foods to provide information related to the content of one or more of 14 specified food allergens within their foods.

Objectives: To investigate the impact of EU FIC on the behaviours, experiences and attitudes of consumers with food allergy when eating out.

Methods: As part of longitudinal research, participants with food allergy from across the UK took part in either A) pre and post legislation in-depth interviews, or B) pre and post legislation surveys. In-depth interviews were carried out with 28 participants pre and post legislation, and analysed using the framework approach. Self-report surveys were completed by 129 participants pre and post legislation, and responses were subject to quantitative analyses.

Results: Improvements in allergen information provision and raised awareness of food allergy in eating out venues was reported following introduction of EU FIC. Whilst participants favoured written allergen information, they expressed greater confidence in communicating with eating out staff and in trusting the allergen information that they provided. Improvements were judged to be gradual, sporadic or inconsistent in implementation.

Conclusion & clinical relevance: For many participants, the 'ideal' eating out experience was one in which a range of information resources were available, and where written allergen information was complemented by proactive and accommodating staff within an allergy-aware environment. Whilst the onus is on legislators and food providers to ensure that adequate allergen information is provided, clinicians play an important role in encouraging patients with food allergy to pursue their legal right to make allergen enquiries in order to avoid accidental allergen ingestion when eating out.

Introduction

Food allergy affects up to 2% of adults and 5% of children[1,2] and represents a major public health concern, which places a substantial burden on healthcare systems, the individuals at risk of adverse reactions, and their families and carers[2,3]. Exposure to allergen is potentially life-threatening for some individuals with food allergy, and strict allergen avoidance is important in day-to-day management of the condition. Adherence to an allergen-free diet can be challenging, particularly where information regarding ingredients and food preparation are insufficient, lacking or misleading. A substantial proportion of accidental allergen ingestion occurs when eating outside the home. Between 21-31% of accidental ingestions occur when eating in restaurants, and 13-23% occur in other eating out settings such as work-place or school canteens[4].

In December 2014, EU legislation (EU Food Information for Consumer Regulation No. 1169/2011, (EU FIC)) was introduced[5]. This regulation requires food businesses providing and selling non-prepacked foods to make available allergen information relating to the inclusion of any of 14 specified food allergens (peanuts, tree nuts, milk, soya, mustard, lupin, eggs, fish, molluscs, crustaceans, cereals containing gluten, sesame seeds, celery, and sulphur dioxide) as ingredients in their foods. The legislation thus affects restaurants, takeaway establishments, food stalls, institutions including prisons and nursing homes, as well as workplace and school canteens. Allergen information can be provided in written or verbal form. Where verbal information is provided, there must also be written information available within the venue that customers can be directed to.

Prior to implementation of the EU FIC regulation, many customers with food allergy expressed a preference for allergen information to be delivered in written form, and preferably on the menu itself[6]. Where information was unavailable, or clarification was needed, consumers with food allergy described the subtle social cues that they applied in gauging the reliability of verbal information delivered by food providers. Information judged to be questionable, led customers to restrict their food choices, in order to reduce the risk of accidental allergen ingestion[6].

In order to investigate the impact of EU FIC on the eating out behaviours, experiences and preferences of consumers with allergy, we conducted semi-structured interviews and surveys before and after implementation of the legislation. Through longitudinal analyses, we aimed to assess whether consumers reported any improvements in their eating out experiences after the implementation of EU FIC.

Methods

Background

As part of wider longitudinal research into the eating out experiences of adults and parents/carers of children with food hypersensitivity[7], participants with food allergy from across the UK took part in either (A) pre and post legislation in-depth interviews, or (B) pre and post legislation surveys. Ethical approval was gained from the institution's departmental ethics committee (Ref: 14-055/16-146). This paper reports findings derived from post legislation interviews alongside longitudinal outcomes from pre and post legislation surveys.

Post legislation interviews:

Recruitment and population

Full details of pre legislation interview recruitment procedures, populations and findings are reported elsewhere[6]. Of the 39 pre legislation interviewees, 28 (72%) returned to complete in-depth interviews between June and July 2016; following EU FIC implementation. Reactions to peanuts (54%), tree nuts (50%), milk (21%), eggs (11%), soya (4%), fish (7%), crustaceans (14%), cereals containing gluten (18%), sesame seeds (4%), and/or celery (4%) were reported. Fifty-seven percent of participants reported reactions to more than one allergen. Characteristics of post legislation participants are shown in results.

Procedure

In-depth semi-structured interviews lasting 27-76 minutes were carried out in participants' homes following a detailed interview protocol (this protocol is available from the corresponding author). Interviews were audio-recorded with participants' permission. Initial questions related to any changes that had occurred in participants' lives; and in relation to their food allergy in particular. Interviews then focused on participants' recent eating out experiences and any changes in these, including their encounters with information about food allergens. They were asked for their

reflections and evaluations of these changes, and about the impact of the legislation on allergen information provision in relation to their eating out experiences.

Analysis

Interview recordings were transcribed verbatim and explored using framework analysis[8-10]. Interviews were coded and analysed using QSR-NVivo (version 10). Identified themes are illustrated in results. Participant details are indicated in brackets as follows: A/P=Adult/Parent; participant number; severity of reaction; and reported food allergens. Italicised text within quotes reflects interviewer prompts.

Pre and post legislation surveys:

Recruitment and study population

Pre legislation (2014) survey participants were recruited from across the UK using the websites and mailing lists of three UK-based charities: Allergy UK (63.2%), Anaphylaxis Campaign (19.6%), Coeliac UK (3.6%); and a professional market research agency: Acumen Fieldwork-Medical (13.6%). Three hundred and ninety-seven participants with food allergy completed the pre legislation survey between October and November 2014 and 129 (33%) returned to complete the post legislation survey between November and December 2016.

Online survey

Participants completed a screening questionnaire to ensure that they met inclusion criteria. Participants (or their child in the case of parents/caregivers) were included if they: a) experienced reactions to one or more of the 14 allergens covered by EU FIC; b) ate out at, or ordered takeaway food from a venue/outlet providing non-prepacked food; c) sought to avoid one or more of the 14 allergens covered by EU FIC; d) experienced one or more symptoms typically associated with IgE-mediated food allergy (see table 1).

Demographic information relating to gender, age-group, country of residence, employment status, and educational level was collected in order to characterise the sample. Participants were classified by the symptoms and severity of reaction that they reported (table 1)[11].

Insert table 1 about here

Pre and post legislation eating out behaviours

Online survey design was informed by literature review; discussions with support groups; the particular expertise of two of the study authors (JSL and MHG); and themes derived from interviews conducted prior to EU FIC[6]. These themes were used as the basis for survey items, which were worded and sense-checked by the research team before being piloted with a sample (n=20) of participants with food allergy. Factor analysis and reliability checks of data from the total pre legislation survey population resulted in six subscales derived from 25 survey items. Subscales are shown in table 2. All pre legislation survey items were retained in the post legislation survey. Full factor analysis results, subscale items and item reversals are shown in 'Supporting information file 1'.

Insert table 2 about here

Procedure

Participants meeting inclusion criteria were routed to the pre legislation survey. Upon completion, participants provided contact details in order to receive an email invitation to take part in the post legislation survey. Two years later, participants were provided with a direct link to the post legislation survey for completion.

Analysis

Analyses were carried out using IBM SPSS Statistics (v22). Data was screened to ensure no violation of normality, linearity, and homoscedasticity assumptions. Extent of missing data (<2%) and non-response patterns were assessed (Little's MCAR test p>.05). Missing values were imputed using expectation-maximization[12]. Structures of eating out subscales were established using factor analysis with oblique rotation to allow for correlated subscales[12]. Twenty-five out of an original 31 survey items were included: six items were excluded due to high inter-item correlations (>.9) or low factor loadings (<.4). Differences between pre and post legislation eating out behaviours were analysed using mixed ANOVAs including 'Adult/Parent', 'allergy severity' (mild/moderate vs severe), 'Multiple allergens' (1-2 allergens vs >2 allergens) and 'time since diagnosis' (2-4, 5-9, > 10 yrs) as independent variables (IVs), and the six eating out subscales as outcome variables.

Results

Characteristics of participants are shown in table 3.

Insert table 3 about here

Post legislation interviews:

Overall impact of legislation

In principle, the implementation of legislation to improve allergen information provision was seen as a positive step, and for many participants this had some tangible impact on their eating out behaviours and preferences (Box 1,A). For others, initial expectations of the legislation did not translate into reality in terms of their day-to-day eating out experiences, although they had experienced some positive changes, they observed that overall implementation of the legislation was gradual, sporadic or inconsistent. Participants were surprised, and in some cases frustrated, by the pace and inconsistency of change (Box 1,B & C). The 'different ways' (Box 1,A) in which venues had implemented the legislation lay at the core of both positive and negative participant evaluations of the legislation's impact in helping them to make confident and safe food choices when eating out. Participants broadly related these themes in the context of the adequacy of information provision, their confidence in the allergen information resources provided by venues, and any resultant impact on the freedom that they enjoyed when eating out.

Adequacy and confidence in written information resources

The majority of participants noted an improvement in the detail and range of written allergen information available to them which at its best, allowed them to trust it and increased their ability to make confident food choices without the need to double check with venue staff. This 'normalised' their eating out experience to a substantial degree. When they judged allergen information provision

as sufficient, participants often interpreted this as implying a wider understanding of the needs of consumers with food allergy. Such venues were assumed to have gone beyond the mere act of providing information itself, and were trusted to exercise more caution in other aspects of their food preparation such as the avoidance of cross-contamination (Box 1,D).

More frequently, participants observed that venues had made some effort to communicate the allergen content of foods, either via the menu (in the form of ingredients details or symbols/colour coding (Box 1,E)), or displayed on a notice within the venue. This information was received with varying degrees of confidence. They appreciated detailed ingredients information on the menu and saw this as an indicator of meals that should either be avoided or were free of specific allergens. Allergens listed in small print raised concerns as did inconsistent use of symbols/coding. However, this increase in visibility was largely seen as 'going in the right direction' (A43 Mild: Peanuts, Gluten) in terms of information provision.

The most widespread change in provision of information that participants had observed was the use of 'please ask our staff' statements, displayed on notices and menus within eating out venues. This was viewed with a sense of uncertainty by many: some felt that this implied an awareness of the needs of consumers with food allergy; that their questions would be welcomed; and that they would receive a constructive and informed response from staff (Box 1,F). Others were more sceptical, (Box 1,G) assuming that the venues were doing the minimum that was legally required to 'cover themselves' (A7 Moderate: Peanuts, Tree nuts) and as such were just 'ticking boxes' (A52 Mild: Tree nuts, Gluten). This suggested a lack of caring for customers with food allergy, which eroded participants' trust and confidence in ordering food from the venue as a result.

Adequacy and confidence in staff as information resources

Whilst the majority of participants favoured the provision of written allergen information as the 'gold standard', they reported an improvement in staff responses to their allergen enquiries since the legislation's implementation. Participants consistently reported increased awareness of their allergen-related needs and the potentially life-threatening results of accidental allergen consumption

(Box 1,H). Participants felt more accepted and less reticent about making enquiries of staff as a result (Box 1,I). Although this in itself was no guarantee that the information that staff provided would be accurate, participants perceived that staff appeared less 'nonplussed' (A11 Moderate: Crustaceans) and more 'knowledgeable' (A28 Moderate: Peanuts) about the allergen content of the foods they were serving. Where such knowledge was lacking, staff were seen as more willing to make further enquiries on participants' behalf, or to provide additional written allergen information. This was carried out with a more positive demeanour than some participants reported having experienced in the past.

Knowledge of the legislation's implementation impacted on participants directly. For some, and particularly those who had been embarrassed about asking staff questions in the past, the legislation provided a sense of empowerment. It gave them permission and the legal right to make enquiries of staff with the expectation of a constructive and informed response (Box 1,J). This impact was not felt universally however, and a minority expressed concerns about being seen as fussy; a scenario which was likely to limit their food choices and reduce their sense of safety within the eating out environment (Box 1,K).

Suggested improvements in allergen information provision

Participants appreciated that there was raised awareness about food allergens and that gradual improvements were being made within eating out environments. Many were willing to give venues the benefit of the doubt for the time being; though they hoped for more universal, standardised, and consistent information provision in the future. Some participants felt that the legislation itself 'shouldn't be as flexible' (A25 Moderate: Peanuts, Tree nuts, Sesame) and should ensure universal, standardised allergen information provision. Participants additionally expressed concern that cross-contamination was not included within the legislation. One participant noted their wish to be '100% sure that you're paying attention to the way that you're cooking it, preparing it, presenting it' (A52 Mild: Tree nuts, Gluten). Equally, several participants observed that improvements in allergen information did not necessarily equate with greater choice for customers with food allergy,

and that eating out venues rarely offered alternatives or ingredient substitutions. As participant A44 (Moderate: Milk) reported, venues were quick to say '"ok then that means you can't eat this" not "we'll provide you that instead"'.

Insert box 1 about here

Pre and post legislation surveys:

Of the 397 participants who completed pre legislation surveys, 129 (33%), returned to complete post legislation surveys two years later. There were no significant differences between participants who returned to complete post legislation surveys and those who did not return, based on pre legislation comparisons- 'adult/parent', 'gender' (adult & parent; child), 'age group' (adult & parent; child), 'number of allergens' (1-2 vs >2), or 'regularity of reaction' (all ps>.05).

Characteristics of returning survey participants are shown in table 3 (for additional background descriptives see 'Supporting information file 2'). Of the 14 allergens covered by the legislation, reactions to peanuts (67%), tree nuts (64%), eggs (36%), milk (36%), sesame seeds (22%), cereals containing gluten (17%), soya (14%), crustaceans (13%), fish (9%), molluscs (7%), lupin (5%), mustard (5%), celery (3%) and/or sulphur dioxide (2%) were reported. Eighty percent of participants reported reactions to more than one allergen.

Changes in eating out behaviours over time

There were significant differences in participants' pre and post legislation eating out behaviours and attitudes, summarised in table 4. Unless otherwise stated, there were no interactions between 'time' and other IVs ('Adult/Parent', 'Severity' (mild/moderate vs severe), 'Multiple allergens' (1-2 allergens vs >2 allergens) or 'time since diagnosis' (2-4, 5-9, >10 yrs)) (all ps >.05).

Insert table 4 about here

Menu as a resource for confident food choices

Participants reported no change in their attitudes regarding the menu as a source of information about allergens.

Confidence in asking staff

Participants reported being more confident in asking staff about allergens post legislation than they had been prior to EU FIC implementation (M pre to post increase=0.70, p<.001). A significant 'time' x 'severity' interaction was shown (F(1,102)= 4.89, p=.035, η_p^2=.04). Participants with a history of severe reactions reported having a greater increase in confidence (M pre=3.43, M post=4.28, p<.001) than those with mild/moderate reactions (M pre=3.38, M post=3.83, p=.032).

Planning and preparation

Participants reported no change in their behaviour regarding planning for eating out (e.g. researching online, telephoning ahead).

Adequacy of menu information

Participant scores increased which indicated a reduction in the need for improvement of menu information following implementation of EU FIC (M pre to post increase=0.20, p<.05).

Staff as resource for confident food choices

Participants reported increased confidence in staff as a resource following implementation of EU FIC (M pre to post increase=0.21, p<.01).

Adventurousness

Participants reported that they were more adventurous following implementation of EU FIC than they had been prior to the legislation (M pre to post increase=0.16, p<.05).

Discussion

Using mixed methods approaches, this study indicates that there have been improvements in the experiences of consumers with food allergy when eating out following the implementation of EU FIC legislation in December 2014.

In general, participants reported improvements in the availability and adequacy of allergen information provision, including improved menu provision, improved confidence in asking staff and the perception that staff were a useful resource for information. Although starting from a low base, there was an increase in how adventurous people felt when eating out. Implicit within these improvements was a perception of raised food allergy awareness on the part of eating out venues and their staff; particularly in relation to the importance of allergen avoidance for customers with food allergy. As an inherently social experience, a number of pre legislation studies have reported the embarrassment and alienation experienced by customers with food allergy when eating outside the home, and these experiences led some consumers to take undue risks or limit their social activities as a result[6,13-17]. The rise in awareness noted by participants suggested a degree of normalisation of food allergy which was welcomed by many.

Importantly, although participants had seen some improvements and continued to value written allergen information, there was increasing willingness to interact with staff about the allergen content of foods, and their confidence in the information provided was improved as a result. Alongside perceptions of improved allergy awareness, participants were emboldened by the knowledge that their allergen enquiries were, in part, legitimised by the introduction of the legislation.

Whilst recognising improvements in allergen information provision since the legislation was introduced, the majority of participants expressed reservations about the pace and coverage of change, and this was reflected in levels of adventurousness when eating out. Although there was an increase in post legislation adventurousness, scores were low suggesting that customers continued to

feel restricted by the risk of accidental allergen ingestion and the social environment in which enquiries about the allergen content of foods must be made. These restrictions were likely exacerbated by venues' frequent use of notices inviting customers 'ask staff' about the allergen content of foods; a practise which many viewed with scepticism.

For the majority of participants, the 'ideal' eating out experience was one in which a range of information resources were available, and where written allergen information was complemented by proactive and accommodating staff within an allergy-aware eating out environment. Eating out venues can convey their willingness and ability to accommodate customers with food allergy by improving the detail and range of written allergen information available on the menu, and through the provision of supplementary information resources, for example: allergen reference sources detailing the ingredients of dishes, and separate menus relating to different allergens. Venues can additionally signal that their staff are attentive to customers' needs by taking a proactive approach from the outset. For example, serving staff could initiate a conversation at the table enquiring about customers' specific dietary requirements[6]. Whilst the onus is on legislators and food providers to ensure that adequate allergen information is provided, clinicians play an important role in educating patients with food allergy about the legislation, by managing their expectations and encouraging them to pursue their allergen enquiries as is their legal right.

Limitations

Participants self-reported their food allergy status, and a minority were self-diagnosed alongside those who were under specialist allergy services. Although this risked over-reporting of food allergy[18] it also allowed us to capture the variety of eating out experiences across the spectrum of food allergy severity and diagnostic certainty, and to assess the impact of the legislation in light of these differences. Additionally all consumers, regardless of the status of their clinical diagnosis are entitled to enquire about, and receive information about the 14 allergens when eating out. Eating out or ordering takeaway food were inclusion criteria for participants within the study. Although this was necessary in order to ensure that participants had experience of eating out prior to and following

implementation of EU FIC, we were unable to account for differences between this population and individuals with food allergy who never eat out. It is possible that this latter population might have expressed different views about the impact of legislation. Similarly, although EU FIC was implemented across Europe, our findings are limited to UK-based populations with food allergy. Eating out experiences in other European countries might have been different in light of the legislation. Lastly, we recognise that attrition rates in this study were relatively high (67%) as is the case in many longitudinal studies[19]. Although we found no pre legislation differences in returning versus non-returning participants based on demographic or allergy-based characteristics, we cannot rule out the possibility of bias in our returning sample.

Despite these limitations, this study highlights the value of using longitudinal, mixed methods to assess the impact of new legislation on the same populations of participants with food allergy over time. The longitudinal application of interviews and surveys allowed us to gain deeper insights into the day-to-day impact of legislative changes for participants with food allergy whilst facilitating conclusions that can be generalised to the eating out experiences of the wider population with food allergy. This would not have been possible using either interviews or surveys alone, or through the use of cross-sectional methods which do not allow the assessment of change over time.

Conclusions

Through the application of longitudinal survey methods supplemented by post legislation interviews, participants with food allergy reported both improvements in the provision of allergen information and raised awareness of food allergy in eating out venues, following the introduction of legislation. Whilst participants continued to favour written allergen information, they expressed greater confidence in communicating with eating out staff and in trusting the allergen information that they provided. These improvements were judged to be limited however, and clinicians have an important role in encouraging patients with food allergy to pursue their legal right to make allergen enquiries in order to avoid accidental allergen ingestion when eating out.

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Competing interests

FMB, JB, MHG, ADG & JSL declare no competing interests.

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Tables & Figures

Table 1: Classification criteria for food allergy symptoms and severity

Severity	Symptoms
MILD/MODERATE	'Stinging nettle' rash, urticaria, hives, Itching or swelling of the lips, tongue or mouth, asthma, wheezing, facial swelling (does not experience 'severe' symptoms)
SEVERE	Breathing difficulties, anaphylaxis, collapse (may also experience 'mild / moderate' symptoms)

Table 2: Summary of survey subscales

Survey subscale	Items	Example of survey item[a]	Response scale	Cronbach's alpha Pre N=397	Cronbach's alpha Post N=129
Menu as a resource for confident food choices	4	The menu displayed outside the place	1 → 5: Higher score = greater use	.89	.88
Confidence in asking staff	4	I am happy to ask serving staff about allergens in the food they are serving'	0 → 6[b]: Higher score = greater confidence	.76	.68
Planning and preparation	6	I ring ahead or email if I am going to be eating in a place I am not familiar with	0 → 6: Higher score = greater planning	.81	.78
Adequacy of menu information	3	Menus should give more information about ingredients that are contained in each dish	1 → 5: Higher score = less need for improvement	.71	.74
Staff as resource for confident food choices	5	Staff preparing or cooking the food	1 → 5: Higher score = greater use	.85	.86
Adventurousness	3	I tend to eat out in the same places	0 → 6: Higher score = greater adventurousness	.70	.73

[a] Items reverse coded where appropriate- full subscale items, response scales and item reversals shown in 'Supporting information file 1'
[b] One item was answered on 1 → 5 scale

Table 3: Characteristics of interview and survey populations

	Interview	Survey
Variable	Post legislation (N=28)	Returning (Pre & Post legislation (N=129)
	N (%) or Mean (SD)	N (%) or Mean (SD)
Adult	23 (82.1)	57 (44.2)
Parent	5 (17.9)	72 (55.8)
Gender		
Adult/Parent		
Male	7 (25.0)	19 (14.7)
Female	21 (75.0)	110 (85.3)
Child		
Male	2 (40.0)[a]	42 (58.3)[b]
Female	3 (60.0)	30 (41.7)
Age (yrs)		
Adult/Parent	40.8 (15.8)	42.4 (10.3)
Child	13.4 (3.2)	9.9 (4.6)
Diagnosis		
Clinical diagnosis *(by GP; Dietician or Allergy specialist at hospital)*	24 (85.7)	121 (93.8)
Self diagnosis	4 (14.3)	8 (6.2)
Time since diagnosis (yrs)		
2-4	7 (25.0)	31 (24.0)
5-9	6 (21.4)	36 (27.9)
≥10	13 (46.4)	59 (45.7)
Severity of reaction		
Mild/Moderate	17 (60.7)	47 (36.4)
Severe	11 (39.3)	82 (63.6)
> 2 Allergens avoided	6 (21.4)	67 (51.9)
Treatment		
Avoidance	28 (100)	129 (100)
Antihistamines	14 (50.0)	103 (79.8)
Injectable adrenaline	11 (39.3)	96 (74.4)
Inhaler	4 (14.3)	65 (50.4)

[a] Child % calculation based on n=5 parent participants.
[b] Child % calculation based on n=72 parent participants.
Where % total <100, there are missing values. Where % total >100, participants could select multiple responses.

Table 4: Overview of change over time for participants with food allergy who took part in Pre and Post legislation surveys

CONSTRUCT	Pre legislation Mean (SD)	Post legislation Mean (SD)	df	F	η_p^2	p
Menu as a resource for confident food choices	2.84 (1.17)	3.07 (1.05)	1,99	0.58	>.01	=.448
Confidence in asking staff	3.42 (1.19)	4.12 (1.28)	1,102	17.62	=.15	<.001
Planning and preparation	3.28 (1.45)	3.39 (1.39)	1,101	0.76	=.02	=.387
Adequacy of menu information	1.50 (0.74)	1.70 (0.95)	1,101	6.20	=.06	=.014
Staff as a resource for confident food choices	3.35 (0.86)	3.56 (0.89)	1,102	9.59	=.09	=.003
Adventurousness	1.27 (0.95)	1.43 (0.99)	1,101	5.17	=.05	=.025

Box 1: Participant quotes

Impact of legislation:

A) I think the legislation is fantastic, yeah. It's the best thing that's happened for me, absolutely and I think everybody is aware of it, but have gone into do it in different ways. (A55 Moderate: Eggs)

B) I do feel like I have more information and I think people are more aware. I think that's probably the most useful thing……It's definitely better but it's not perfect though, because you've still got people who aren't doing it. (A47 Moderate: Tree nuts)

C) 18 months on and we've probably moved a little bit but you really would have hoped that it would have moved a lot more than this and it's a bit of a shame it hasn't isn't it? (P6 Mild: Peanuts, Tree nuts)

Adequacy and confidence in written information resources:

D) …when [allergen information] is available and there is a check list of allergens, it does make me feel more confident ordering there, because you've had the chance to check, they've had the chance to write it and so I feel like they are more aware and better at dealing with it and probably are better at dealing with cross contamination as well. So I do think it has helped me being confident in eating in certain places definitely. (A59 Severe: Peanuts, Tree nuts, Milk, Eggs)

E) Yes I noticed the menu's quite a bit more detailed and bold; it's quite big now about allergies, yes. *So when you say more detailed menus?* Like there'll be a big coloured key. In the local (Asian restaurant) they've highlighted each, like say- nuts are in one colour, seeds in another. Yes, it'll say exactly what's in each dish. (A25 Moderate: Peanuts, Tree nuts, Sesame)

F) *Do you think that you now have more information on which to decide on what you're going to eat?* Yes, I think so. *Even though it's just an invitation to ask or is it in other ways?* No, it's still an invitation to ask isn't it?... Most of them are knowledgeable now. (A28 Moderate: Peanuts)

G) More often than not, on the bottom of a menu there is this ubiquitous 'if you have any allergies please let us know and we'll do the best to accommodate you'. That to me is the most meaningless phrase ever, because it means nothing (A52 Mild: Tree nuts, Gluten)

Adequacy and confidence in staff as information resources

H) I think people are more aware. They realise it could be life threatening. People do have to carry epi pens. I believe there's a new law brought in where they have to state whether a food had, what ingredients and if people are allergic, especially things like nuts. I think everyone is more aware and take more care. (A58 Severe: Peanuts, Tree nuts)

I) I would say that it wasn't sort of everywhere…but I would say it's definitely something that has made people much more accepting and aware that they need to have like chefs and staff that are willing to really be very transparent about (allergen) information when asked. (A49 Severe: Crustaceans)

J) It wouldn't really faze us if I wanted something to go in and ask, because I've got the 'right to ask'. (A55 Moderate: Eggs)

K) …it should be on the menu. I don't think you should have to [ask]- sometimes people will act like you're making an unnecessary fuss so I tend not to [ask] because of that (A45 Severe: Milk, Gluten)

Supporting information file 1: Factor analysis of pre legislation eating out behaviours and preferences for allergen information provision

(Based on analysis of N=397 pre legislation participants with food allergy)

Survey section & item	Subscale						Pre legislation (N=397)	Post legislation (N=129)
	Menu as resource	Confidence in asking	Planning	Adequacy of menu	Staff as resource	Adventure	Cronbach's α	Cronbach's α
F1: The menu displayed outside the place (R)	.913						.887	.881
F1: The menu displayed at the counter (R)	.898							
F1: The menu at the table (R)	.854							
F1: Menu information online (R)	.772							
E: I don't like asking staff questions about allergens (R).		-.874					.757	.680
E: I feel awkward and embarrassed to ask staff questions about the food they are serving (R).		-.847						
F3: I feel more confident asking about allergens when I eat out.		-.652						
E: I am happy to ask serving staff about allergens in the food they are serving.		.-516						
E: I ring ahead or email if I am going to be eating in a place I am not familiar with.			.768				.806	.775

Survey section & item	Subscale						Pre legislation (N=397)	Post legislation (N=129)
	Menu as resource	Confidence in asking	Planning	Adequacy of menu	Staff as resource	Adventure	Cronbach's α	Cronbach's α
E: I ask to speak to the manager if I want more information about allergens in the dishes.			.727					
E: I ask to speak to the chef if I want more information about the meal being cooked for me.			.725					
E: I do research online if I am going to a place I have never been to before.			.647					
E: I use information provided by support groups to help me make better decisions about eating out.			.683					
E: I usually decide what to have beforehand and check it will be ok			.574					
G: Menus should give more information about ingredients that are contained in each dish				.865			.706	.741
G: I would like to see more information about the exact ingredients provided in menus				.796				

Survey section & item	Subscale						Pre legislation (N=397)	Post legislation (N=129)
	Menu as resource	Confidence in asking	Planning	Adequacy of menu	Staff as resource	Adventure	Cronbach's α	Cronbach's α
G: More information about ingredients in menus would be confusing (R)				.777				
F1: The serving staff (R)					-.885		.852	.864
F1: The counter staff (R)					-.850			
F1: Staff you speak to on the phone (R)					-.842			
F1: Staff preparing or cooking the food (R)					-.766			
F3: I feel more confident that the information that staff give me is reliable					-.514			
E: I tend to pick the same things to eat when I am eating out (R).						.883	.700	.727
E: I tend to eat out in the same places (R).						.820		
E: I try and eat out at new places whenever possible.						.583		

(R)= reverse coded. Response scales by survey section: E, 0→6= Never→Always; F1, 1-5= Very satisfied→Very dissatisfied; F3, 1-5= Strongly disagree→Strongly agree; G, 1-5 Strongly agree→Strongly disagree

Supporting information file 2:

Further demographic and background characteristics of 129 returning survey participants

Variable	Returning participants (Pre & Post legislation, N=129) N (%)
Adult	57 (44.2)
Parent	72 (55.8)
Education completed	
Secondary only	52 (40.3)
Further/Higher	77 (59.7)
Employment status	
Employed (full time)	42 (32.6)
Employed (part time)	39 (30.2)
Self-employed	11 (8.6)
Not employed (not seeking employment- e.g. homemaker, retired, student)	34 (26.5)
UK region of residence	
East Midlands	8 (6.2)
East of England	12 (9.3)
London	22 (17.1)
North East	5 (3.9)
North West	13 (10.1)
Northern Ireland	4 (3.1)
Scotland	7 (5.4)
South East	20 (15.5)
South West	8 (6.2)
Wales	4 (3.1)
West Midlands	11 (8.5)
Yorkshire & Humber	13 (10.1)

Where % total <100, there are missing values