

Middlesex University - BSc Environmental Health.

‘An improvement in the way online delivery services present allergen information would increase food allergic consumer confidence, so much so, they would be willing to pay more for a meal from such restaurants.’

Nanci Pomfrett
Student number - M00680216
Module code – PRS 3988
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Supervisor: Adam Choonara, School of Science and Technology, Middlesex University,
Hendon Campus, The Burroughs, London, NW4 4BT.

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Abstract

This study investigates food allergic consumer experience when ordering food from third party delivery services (e.g. Just Eat/Deliveroo/Uber Eats). This study also looked to explore food business operator perceptions regarding the accessibility and presentation of allergen information on third party food delivery sites.

Two electronic questionnaires were distributed, one to food allergic consumers and the other to food industry staff.

Of 137 responses 98% of food allergic consumers felt that there needed to be improvements in the presentation and accessibility of allergen information on online food delivery websites. In terms of ordering food for delivery online, 96% of food allergic consumer respondents felt that they would feel more confident that allergens had been correctly identified and managed if the allergen information online was well presented and accessible and of those who would feel more confident, 67% would also be willing to pay more for a meal from a restaurant that had clear and accessible allergen information on online delivery websites.

Further to this, 91% felt that they were put at a disadvantage when ordering food online compared to non-food allergic consumers. It was largely reported that food allergic consumers felt they had less menu options, were put at higher risk and experienced inconvenience when using online food delivery services.

Glossary of terms used

‘Third party delivery sites’, ‘online food ordering websites’ and ‘food delivery services’ have been used interchangeably throughout this study.

1. Introduction

Food is an integral part of life; nutrition gained from food is essential in supporting the human body. As well as this, social interactions and cultural events often centre around eating. However, for food allergic consumers eating certain foods can cause fatal anaphylaxis (NHS 2019).

Food allergy is a relevant and current Public and Environmental Health concern, with approximately 11-26 million people in Europe reporting to suffer with one or more food allergies (Pawankar et al 2013). Public awareness and knowledge of food content in general has become an increasingly talked about topic this includes food allergy awareness.

Conversations in the public eye are common place. Particularly following a number of high-profile deaths including that of both Owen Carey and Natasha Ednan-Laperouse who both died following reactions brought on by eating meals prepared outside of the home (NARF 2019). In response to this, in 2019 The Food Standards Agency (FSA) announced there would

be new measures introduced to protect consumers with food allergies (FSA 2019).

Food allergy deaths are particularly concerning due to their preventable nature, with the coroner's report on the death of Owen Carey listing shortfalls such as effectiveness of staff training and placement of allergen notices as contributing factors in his death (Courts and Tribunals Judiciary 2019). While change is happening, it is clear that improvements are still required.

Food delivery services (E.g. Just Eat) are becoming increasingly popular and are gradually becoming an instrument of survival for restaurants (Ray et al. 2019). The use of food ordering services is likely to have increased due to COVID19 restrictions. For the most part of 2020, food delivery was one of the few ways food businesses were permitted to operate. In the UK alone, third party delivery service 'Just Eat' features over 29,000 restaurants on its sites/app (Just Eat no date) while 'Deliveroo' works with 140,000 food establishments globally (Deliveroo 2021).

It is clear that ordering food online can be beneficial to consumers, Cheow et al. outlined the main benefit as the convenience it provides (Cheow et al. 2017), however the risk posed to food allergic (FA) consumers with the addition of the 'middle man' is little documented.

2. Aims

2.1 - To understand if an improvement in the way online delivery services present allergen information would increase consumer confidence.

2.2 - To understand if consumers would be willing to pay more for a meal from a restaurant that had accessible allergen information on online food delivery websites.

2.3 - To understand if food business operators that use third party delivery platforms feel there could be improvement made to websites in terms of the way that allergen information is presented.

2.4 - To understand if food business operators believe there is improvement needed on third party delivery services in regards to the presentation of allergen information.

3. Literature review

This literature review outlines the current body of research surrounding FA consumer experiences, as well as identifying any gaps or opportunities for further research.

There is little research published relating specifically to FA consumer experience when ordering food through online delivery partners, however insights around FA consumer experience ordering food prepared outside of the home in general are relevant to consider.

3.1 Food allergy

Food allergy is caused by a specific immune response in the human body. The National Health Service (NHS) explains food allergy as when the body mistakenly processes proteins in certain foods as a threat (NHS 2019). The protein content of the most common food allergens (milk, egg, peanut, tree nut, shellfish, fish, wheat, sesame seed and soy) are generally resistant, i.e. they cannot be denatured by heat and acid. This means that they can cause sensitivity after processing, storage, cooking and digestion (Waserman & Watson 2011).

Food allergy symptoms can range from mild to severe and onset usually ranges from seconds to minutes after consumption (NHS 2019). The most common type of reaction is IgE-mediated (NHS 2019). IgE (Immunoglobulin E) are antibodies produced by the immune system (AAAAI no date), consuming allergenic foods stimulates production and the antibodies bind with the proteins to trigger the release of substances such as histamine, prostaglandins and leukotrienes (Waserman et al. 2018). This in turn displays as an allergic reaction (Waserman et al 2018).

The NHS outlines symptoms of IgE-mediated food allergy to be:

- tingling or itching in the mouth
- hives (a raised, itchy red rash)
- swelling of the face, mouth, throat or other areas of the body
- difficulty swallowing
- wheezing or shortness of breath
- feeling dizzy and lightheaded
- abdominal pain or diarrhoea
- hay fever-like symptoms (NHS 2019).

IgE-mediated food allergy is a leading cause of anaphylaxis. Anaphylaxis is a severe allergic reaction and can be life threatening (NHS 2019). Of all reported anaphylaxis, 30% occur as a result of food allergy (Avilla et al 2018). The effect on the body is vast and can involve multiple systems including the muscular skeletal, respiratory, digestive and cardiovascular systems (Avilla et al 2018).

It is widely accepted that it is challenging and resource intensive to determine food allergy prevalence with certainty. However, in 2011 Sicherer summarised that food allergies are common and impactful, and likely to have increased in prevalence similar to other atopic disease (Sicherer 2011).

Loh and Tang (2018) reiterate that good quality data on prevalence is lacking, however the study supported that food allergy is recognised as a 'growing Public Health burden'. Research carried out in 2013 suggested that approximately 11-26 million people in Europe report to suffer with a food allergy (Pawankar et al 2013). Pawankar furthered this by

projecting the trend onto the global populations, and estimated that approximately 240-550 million people worldwide suffer from food allergies (Pawankar et al 2013).

Building on existing prevalence research, The Association of UK Dietitians in 2015 estimated that 'between 1-10% of adults and children have a food hypersensitivity' (BDA 2015).

Overall, it is evident that while food allergy is a concerning Public Health crisis, there is little data available to confirm the prevalence particularly in relation to the UK.

3.2 Consumer perception

There is currently no cure for food allergy which means that strict avoidance is a key management method, as well as preparation for treatment in the form of medication, for example EpiPen's (Sicherer 2011). There has been some discussion of other food allergy management methods such as vaccines and vitamin consumption as a child although Muraro (2014) notes that these claims are not well supported by evidence (Muraro 2014).

When faced with the challenge of ordering food outside of the home, a study of FA consumers found that there five reaction prevention strategies often relied on, these were: speaking to waiter on arrival (80%), ordering food with simple ingredients (77%), double checking food before eating (77%), avoiding restaurants with higher likelihood of contamination (74%) and reviewing ingredients on a restaurant website (72%) (ACAAI 2018).

A 2007 study that involved volunteer Environmental Health Officers covertly ordering takeaway foods found that 13 out of 62 meals (1 in 5) contained levels of peanut that could have triggered fatal anaphylaxis (Walker & Davey 2007). Researchers explicitly made takeaway staff aware that they had a peanut allergy. Food samples were then weighed and analysed to identify the presence of peanuts, and in addition to the main finding it was also noted that 'most' front of house staff did not check the allergen information of the meal with the chef (Walker & Davey 2007).

The reoccurring theme of eating out being a risk to FA consumers is further solidified with Kwon et al. (2020) finding that that a 'significant proportion' (69.8%) of their participants in a 2020 study had experienced food allergy reactions at commercial restaurants (Kwon et al. 2020). Kwon et al (2020) also outlined that a lower level of food allergy knowledge in food establishment staff coupled with poor communication increases risk of anaphylaxis to FA consumers (Kwon et al. 2020).

A key finding from Barnett et al (2020) was that customers feel that allergy conversations are initiated when information provided to them is unclear, although these conversations are often restricted out of fear of being labelled a 'fussy eater' (Barnett et al. 2020).

In terms of the way allergens are presented, Begen et al. (2016) found that written

information was 'overwhelmingly preferred' when ordering food from establishments compared to verbal communication. (Begen et al. 2016).

3.3 Food industry staff knowledge

Food industry staff play an important role in FA consumer experience when eating food prepared outside of the home. Barnett (2020) outlined that food allergen knowledge in restaurant staff underpins 'trustworthy conversations' (Barnett 2020).

Soon (2018) summarised that of a sample of food industry staff that took part in research 'some' had good knowledge. However gaps in knowledge were identified, for example it was found that 1 in 3 staff members did not know that allergens can be transferred by hands (Soon 2018). Soon (2018) further built on findings in 2020 by exploring why food industry staff may lack knowledge. Using a survey distributed across 500 food establishments in the UK 'high staff turnover' and 'lack of training time' were noted as key barriers to good food allergy knowledge (Soon 2020).

It has been found that of a sample of food industry staff, only 32.6% had training that included asking customers if they have a food allergy (Wen & Kwon 2017). The same study also concluded that participants had similar ideas when it came to the responsible party (in preventing reactions), customers held the highest percentage, followed by kitchen staff and service staff (Wen & Kwon 2017). Soon (2018) furthered this finding by adding that takeaway staff 'unanimously' agreed that it is the responsibility of the consumer to inform them of allergies (Soon 2018).

The finding that food industry staff sometimes lack perfect food allergen knowledge is further solidified by Loerbroks et al (2019) who found that only 30% of restaurant staff correctly identified allergens upon questioning (Loerbroks 2016). Following a true or false quiz on food allergens and the risks they present, less than half (41%) scored full marks (Loerbroks et al. 2019).

Food industry staff training is controlled primarily by management, to this end a 2016 research project concluded that managers are providing little training on allergens, risk and communication (Wen & Kwon 2016). On top of this, 'some' managers reported that communication often one sided, on a consumer-to-staff basis, and that allergen training held low significance in restaurant settings (Wen & Kwon 2016).

3.4 Legislation

The requirement to label food items with allergens has been required by law in the UK for many years, according to Gedel (2012) the development of such law was complex due to the number of foods that are allergens (Gedel 2012). The NHS state that 'almost any food can cause an allergic reaction' (NHS 2019), however there are 14 that are considered to be the most common by law, these are often described as the 'major' allergens.

In 2011 EU Regulation 1169/2011 was introduced (also known as The Provision of Food Information to Consumers Regulations (FICR)). Article 9 of the FICR outlined a list of mandatory requirements that must appear on the labels of pre-packed and non-prepacked food products for sale (Council Regulation 1169/2011). Included in the list of mandatory requirements was the requirement to list allergens (Council Regulation 1169/2011).

Under the FICR the required labelled allergens are:

- Peanuts
- Tree nuts
- Milk
- Soya
- Mustard
- Lupin
- Eggs
- Fish
- Molluscs
- Crustaceans
- Cereals (containing gluten)
- Sesame seeds
- Celery
- Sulphur dioxide (Council Regulation 1169/2011).

Following the implementation of these regulations, Barnett et al. (2017) found that FA participants reported an improvement in allergen information provision as well as raised awareness of allergies when eating out in restaurants in the UK (Barnett et al. 2017).

According to the Food Standards Agency (FSA) 'Ordering a takeaway meal is considered distance selling.' (FSA 2020). Distance selling describes food that is sold via the phone or online (FSA 2020). It is required that allergen information is available to the consumer at the point of sale and at the point of delivery (FSA 2020). There is no specified way this must be provided, for example written or orally provided allergen information is permitted (FSA 2020).

Under the Food Safety Act 1990 there are various relevant offences, under Section 7 it is an offence to sell food for human consumption that is 'injurious to health' (FSA 1990). Under Section 14 it is an offence to sell food that is not of the 'nature', 'substance', or 'quality' demanded by the purchaser (FSA 1990). As well as this, it is an offence to 'falsely or misleadingly describe or present food' (Section 15) (FSA 1990).

Most recently, legislation has been passed that requires allergen labelling on all prepacked for direct sale (PPDS) foods (this means foods that have been packed on the same premises from which they will be sold) (FSA 2020). From October 2021 it will be a requirement that all PPDS food items are labelled with a full list of ingredients where allergens are 'emphasised'

(FSA 2021). Figure 1 shows an example of a food item label where the allergens are 'emphasised', the item in figure 1 is not PPDS although it outlines the type of labelling that could be used to meet requirements following October 2021.



Figure 1: Photo outlining an example of allergens being emphasised (in bold) within an ingredients list (Authors own 2021).

4. Rationale

From reviewing the literature it is evident that there is a gap in research that explores FA consumer experiences when ordering food online for delivery. This study aims to broaden the scope of current research, raise awareness to the potential difficulties FA consumers face, and to identify solutions to increase FA consumer confidence when ordering food from online delivery services.

It is clear that FA consumers prefer written information, alongside knowledgeable staff members (Begen et al. 2016). This is something that could be easily portrayed via online food ordering websites however it is unclear at present if this is an issue that FA consumers face.

5. Methodology

The importance of collecting reliable, valid and ethical data cannot be underestimated. There are many study designs available to a researcher, each will have advantages and disadvantages and it is important to choose the most relevant study design in order to meet the requirements of the research questions (Rakesh & Ranganathan 2018). Factors such as availability of resources, the goal of the research and the sample population will influence the study design (Rakesh & Ranganathan 2018).

5.1 Study Design

The type of data collection used in this research is mixed method, meaning both quantitative and qualitative data has been gathered (Creswell & Wisdom 2013).

Using a mixed method approach can improve the reliability of data, however it can be time and resource consuming (Abowitz & Toole 2009). Quantitative data will allow the researcher to draw statistical conclusions and carry out detailed assessment in regards to patterns and trends in responses (Driscoll et al 2007). Qualitative data will allow the researcher to gain a deeper understanding of the data. Driscoll et al. (2007) explained that giving participants the opportunity to provide qualitative data can highlight 'key insights into unexpected relationships' (Driscoll et al 2007).

The mix of both quantitative and qualitative has been noted as improving data quality (Madey 1982). Madey (1982) outlined the benefits of combining methods as helping to develop conceptual frameworks and to improve validity. For example, it was noted that quantitative findings can be reinforced by referring to findings highlighted in qualitative data (Madey 1982).

Two electronic surveys were developed which featured both open and closed questions:

- Survey 1 was for distribution to FA consumers,
- Survey 2 was for distribution to food industry staff.

The survey for FA consumers contained seven closed questions and five open questions. The survey for food industry staff contained five closed questions and two open questions. The use of an electronic survey was suitable for the type of research questions posed and the use of the internet meant that both surveys had the opportunity to reach large groups of potential participants.

Electronic surveys have a cost benefit, can be fast to collect data, and can reach a wide range of participants. However concerns have been raised around the security of the use of the internet (Dominelli 2003). For this research project this was not anticipated to be a concern due to no personal data being recorded. As well as this, many criticisms noted regarding the use of online survey are outdated. For example, in 1997 Schmidt listed hardware and software requirements as potential setbacks, whereas this is not so much of a concern today with the development and accessibility of technology (Schmidt 1997).

The surveys were distributed online originally via email. The surveys generated two separate links that were able to be shared onwards so that participants could pass this to other perspective participant, this is a method known as snowballing (Johnson 2014). Using this method the researcher was able to make use of participant networking in order to reach a larger number of respondents.

Generally snowball sampling is useful where the target sample is hard to reach (Naderifar et al 2017). For this research COVID19 restrictions made it particularly hard to reach the sample, therefore the use of snowball sampling has been invaluable.

Figure 2 shows a post on social media that was arranged as part of the researchers networking.



Figure 2: Post on social media as a result of researchers networking.

Figure 3 shows a post on social media as a result of snowballing.

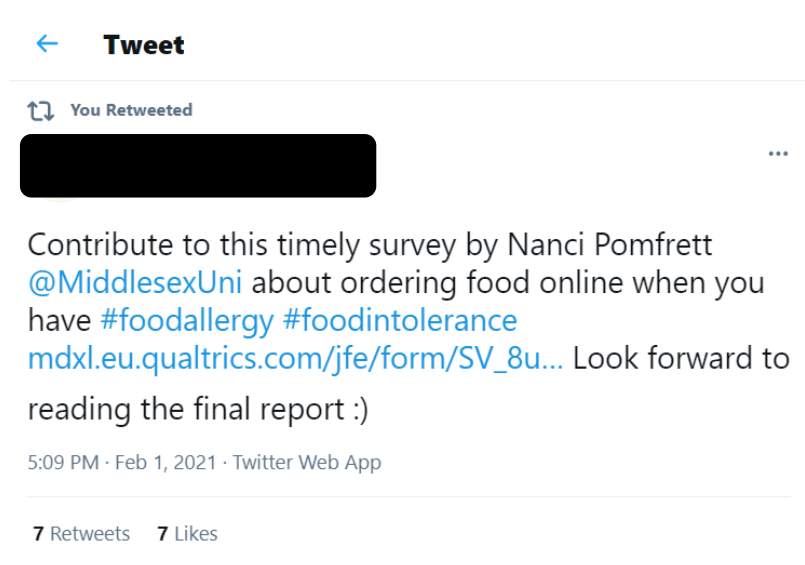


Figure 3: Post on social media as a result of snowballing (name covered for confidentiality).

Appendix 3 is a copy of the survey to FA consumers.
Appendix 4 is a copy of the survey to food industry staff.

Alternative methods, such as one-to-one interviews and case studies were not used in this research due to limitations including cost effectiveness (Merriam & Tisdell p195). Additionally, the researcher was under a time pressure and while interviews could have provided rich qualitative data, the time consumer nature of them meant it was not a suitable method to use (Merriam & Tisdell p195). Focus groups are small interview led meetings that consist of participants that possess specific characteristics (Krueger & Casey 2015). This is a method that could have potentially been used for this research however focus groups conducted online using a platform such as Zoom would have been hard to mediate, and not as free flowing as in person interactions. The researcher felt that the use of focus groups was not an appropriate method due to the sensitive nature of the topic, confidentiality would have been hard to manage as well as participant comfort.

5.2 Study Population

The surveys did not gather any personal data and to that end the researcher is unaware of the demographic of participants. However, there was inclusion criteria:

- For survey 1, participants considered themselves to have a food allergy and made use of third-party delivery services.
- For survey 2, participants work within a food establishment that offers a delivery service

via a third-party platform.

Inclusion criteria can aid researchers in identifying participants with necessary characteristics required in order to answer the research questions (Ferreria & Patino 2018). The inclusion criteria were necessary in this project because of the specific nature of the aims, the inclusion of those without a food allergy, or those that do not work in a food establishment that provides delivery via third party platforms, would have been redundant in answering the aims.

It is important to consider all aspects of the study design and the researcher has therefore considered the possible limitations of using inclusion criteria. Connelly outlines the potential for inclusion criteria to become restrictive (Connelly 2020).

A limitation noted in relation to the sample population is that unintended exclusion criteria had occurred. The surveys were published in English and so this limited the sample population. Connelly (2020) further noted that if 'exclusion criteria are extensive, only a narrow group may be targeted' (Connelly 2020). This could have an impact on the validity of the research.

The study population was reached by requesting assistance from various allergy charities, for example Anaphylaxis UK agreed to share the link for survey 1. This meant that the researcher was able to access those who meet the inclusion criteria.

Food Allergy Aware agreed to share the link for both surveys 1 and 2. The researcher also made direct contact with 50 food businesses, inviting them to take part.

The total study population was 144:

Survey 1 – 143 participant responses

Survey 2 – 1 participant response.

Appendix 1 shows the email sent to Anaphylaxis UK inviting them to share the research as well as an example of the email sent to food business operators inviting them to participate.

5.3 Ethical Consideration

To have an understanding of ethical principles is considered to be a key skill in carrying out a research project (Farrimond p11). To that end, the ethics of this research project has been considered in order to prevent harm to participants.

Ethical approval was granted by The Natural Sciences Research Ethics Committee (REC) on the 15th February 2021.

Data collection took place from 1st February – 25th March 2021.

It is important when using snowball sampling that the confidentiality of participants is considered, as it is possible that the identities of participants are more likely to be known to

other participants (Naderifar et al 2017). In order to ensure confidentiality was protected no personal information was recorded.

Participation was voluntary, and an information sheet (see appendix 2) covered the surveys outlining the research aims and requirements to take part. This information sheet allowed the participants to make an informed decision regarding consent. Participants were then able to self- complete and submit the survey online.

The researchers contact details were provided in the event any participant wished to withdraw or raise questions.

It was not anticipated that there would be any adverse effects on participants however, in the eventuality that there were, participants could withdraw at any time.

5.4 Data Analysis

The quantitative data was exported from Qualtrics into Microsoft Excel, from there the relevant information was transferred to Minitab. After data clean up there were 137 useable responses. The data was first recoded from text to numeric data. Minitab was then used to run descriptive statistics on questions 1,3,5,7,9 and 11.

The qualitative data from questions 2,4,6,8,10 and 12 were exported from Qualtrics into Microsoft Word. The responses were first separated into individual participants, creating 137 lines. The responses were read as a whole before being analysed, following this the responses were grouped into themes in order to carry out content analysis. The researcher made the decision not to re-value qualitative data into quantitative in order not to lose depth. This a potential limitation noted by Bazeley (2004) who highlighted that in doing so issues around validity can arise due to the data becoming single dimensional, meaning that the opportunity to explore 'how' issues arise can be lost (Bazeley 2004).

6. Results

6.1 Survey 1 (FA consumer survey)

Initial screening removed incomplete surveys, leaving 137 useable responses. Table 1 shows the recode summary for values from questions 1,3,5,7, and 9. The original values of 'yes' and 'no' became 1 (yes) and 2 (no), any missing responses were coded as '0'.

Table 1: Recode summary for response values.

Original Value	Recoded Value
Yes	1
No	2
Missing	0

Question 1 & 2

Table 2 outlines that 88% of participants felt there was a difference in the way allergens are managed on online delivery services compared to dining inside the restaurant.

Table 2: Results as descriptive statistics for question 1 (Do you feel there is a difference in the way allergens are managed through online ordering partners (E.g. Just Eat) compared to dining inside the restaurant?)

Variable	Response	Total Count	Percent
Question 1	1	120	88%
	2	17	12%

When further detail was added (question 2) the main themes that emerged were 'lack of information' 'blanket disclaimers' and 'having to phone'.

- Lack of information

One of the main differences listed was that 3rd party delivery websites lacked allergen and ingredient information compared to dining inside a restaurant. Multiple participants described allergen information as being 'rarely' available online, whilst in a restaurant it is 'more common' to receive an allergen guide before placing an order. Whilst detailing the lack of information completely, many participants also made reference to a lack of 'detail' in information that is available. Where participants mentioned lack of detail, this was almost always followed up with being more confident or 'reassured' ordering face-to-face.

- Blanket disclaimer

Another key difference was that a blanket disclaimer is used online, this closely linked with responses that detailed 'in restaurants it's taken more seriously' and there being a lack of care compared to dining inside a restaurant. Multiple participants further offered an explanation for this, stating that more care is given in restaurant as a result of being able to physically 'see' the FA consumer. Participants perceived that face-to-face contact provides more safety and that blanket disclaimers online were 'not safe'.

-Having to phone

The most frequent difference noted by participants was the requirement to phone the restaurant direct when ordering online, rendering the 3rd party site a 'middle man'. This situation does not occur when dining inside a restaurant, as many participants explained they were able to have 'direct' contact with the chef. Written communication (in dine-in restaurants) was noted to be preferred when participants compared it to the verbal phone conversation that occurs when prompted to by online delivery partners.

Question 3 & 4

Table 3 shows that 134 participants answered yes, and 3 participants answered no. This equates to 98% of respondents feeling that there could be improvement in the presentation and accessibility of allergen information on online food ordering websites.

Table 3: Results as descriptive statistics for question 3 (Do you think the presentation and accessibility of allergen information on online ordering services could be improved upon?).

Variable	Response	Total	
		Count	Percent
Question 3	1	134	98%
	2	3	2%

When further detail was added (question 4) the main themes were 'symbols' 'opportunity for communication' and 'interactive menus'

- Symbols

One of the most common responses outlining improvements was the inclusion of symbols to highlight allergens on the online menus. There were various phrases used that came under the theme of 'symbols' including, 'coded', 'colour coding' and 'pictures to indicate allergens'. Where participants did note improvements such as these, many also stated that symbol systems used need to be 'consistent'. With some furthering that consistency should be 'across all providers'.

- Opportunity for communication

Participants regularly mentioned that they would feel more comfortable if there was an opportunity to communicate with their chosen restaurants online (without having to phone). Participants felt that the communication on third party sites should extend further than just allergen identification. Multiple participants identified that they would feel it would be an improvement if there was information provided regarding procedures, kitchen layout, preparation areas and any possible risks of cross contamination.

- Interactive menus

Website functions such as filters, search by allergen functions, and sophisticated profiles were mentioned multiple times. The majority of participants used the phrase 'allergen filter menus' as part of their response. Participants explained that they felt it would be an improvement if they were able to only be shown meals they could safely eat. A common accompanying explanation was that this would provide 'convenience' when ordering. The use of interactive menus was further mentioned when participants stated that they thought it would be an improvement if meals were able to be 'amended' for example one participant stated 'more opportunities to amend dishes, such as no cheese on a burger'.

Question 5 & 6 –

Table 4 shows that 96% of respondents felt that they would feel more confident that allergens had been correctly identified and managed if the information presented online was clear and accessible.

Table 4: Results as descriptive statistics for question 5 (Would you feel more confident that allergens had been correctly identified and well managed by your chosen restaurant, if the allergen information online was clear and accessible?).

Variable	Response	Total Count	Percent
Question 5	1	131	96%
	2	6	4%

Six participants (4%) felt that they would not feel more confident even if allergens were well presented and accessible, when further detail was added (question 6) the main themes were 'verification' and 'trust'.

- Verification

Of those who answered that they would not feel more confident that allergens had been correctly managed if the information online was presented better, over half used still needing to 'verify' allergen information with the chef as the main reason. Alongside this response, participants went into further detail by saying that they 'never' felt certain when ordering food online.

- Trust

The theme of 'trust' was a feature in two thirds (4/6) of the 'no' responses. Participants detailed that allergen information online seems like a 'tick box exercise' and for this reason participants were unable to trust third party delivery sites. Another explanation for the lack of trust was that because restaurant staff could not physically see the possible reaction, they do not take allergen requests as seriously compared to ordering food inside a restaurant.

Question 7 & 8

Table 5 outlines that 124 participants (91%) felt that online ordering services *do* have a responsibility to provide allergen information. One participant did not answer and 12 (9%) felt online ordering services *do not* hold the responsibility.

Table 5: Results as descriptive statistics for question 7 (Do you feel that online ordering services (E.g. Just Eat) have a responsibility to provide allergen information for meals?).

Variable	Response	Total Count	Percent
Question 7	0	1	0.729%
	1	124	91%
	2	12	8.759%

When further detail was added (question 8) the main themes were 'profit' and 'safety'.

- Profit

The majority of participants felt that 3rd party sites were responsible for providing allergen information, often it was felt this was because they profit from 'selling' food. The theme of profit was linked to a large majority of the participants who described 3rd party sites as 'hosts' and 'suppliers' of the meals. One participant compared third party delivery sites to the waiter when dining inside a restaurant, for this reason they felt that they were 'part of the chain' and so carried responsibility

- Safety

The theme of safety was vast, and almost all participants mentioned phrases that fit into the category. The most common phrases were 'duty of care' 'responsibility to set standards' 'safeguarding' and 'accountability'. Participants widely felt that the involvement of third-party delivery sites meant that they were part of the supply chain and held a responsibility to provide safe meals to FA consumers. Many participants again compared third party delivery websites to dine-in restaurant staff, participants perceived this role as giving them responsibility to provide allergen information.

Question 9 & 10

Table 6 shows that 125 participants (91%) felt that they were at a disadvantage when ordering from online food delivery sites, compared to non-allergic consumers.

Table 6: Results as descriptive statistics for question 9 (Do you feel that you are put at a disadvantage when ordering from third party sites, compared to non-allergic consumers?).

Variable	Response	Total	
		Count	Percent
Question 9	1	125	91%
	2	12	9%

When further detail was added (question 10) the main themes were ‘more time’ ‘less choice’ ‘blanket disclaimer’ and ‘social situations’.

- More time

Participants largely noted that ordering food online took much longer than their non-food allergic counterparts, for this reason participants felt they were put at a disadvantage. Some participants added to this explanation by stating that extra time taken was due to having to phone the restaurant direct, as there was ‘no allergen information online’.

- Less choice

The majority of participants responded that they feel disadvantaged as they are offered ‘less choice’ in regards to menu items compared to non-food allergic consumers. One participant used the phrase ‘less choice, more risk’ another noted that they ‘have to order the same over and over’.

- Blanket disclaimer

Blanket disclaimers were often reported as a reason FA consumers felt disadvantaged, with participants explaining that blanket disclaimers often meant they were not able to order online at all. Alongside this, various participants recorded past experiences where orders had been refused by restaurants who would not offer specific allergen information past the blanket disclaimer.

- Social situations

When answering question 10, regardless of the explanation given (whether less choice, more time or blanket disclaimers) participants recorded that in social situations they felt more at a disadvantage using third party delivery sites compared to their non-food allergic counterparts. When ordering in social situations, participants added that they felt ‘embarrassed’ ‘stressed’ or ‘excluded’.

In addition to these findings, the particular phrase ‘inconvenience’ ran through almost every answer. Participants felt that, regardless of the specific reason, they were put at a disadvantage compared to non-food allergic consumers because of the inconvenient process of ordering food through online delivery services. Participants also added an indication as to the frequency of feeling at a disadvantage, most commonly stating that they are ‘always’ put at a disadvantage compared to non-food allergic consumers.

Question 11 & 12

Table 7 shows that 92 (67%) participants stated that they would be willing to pay more for a meal from a restaurant that had accessible food allergen data on online delivery websites. Table 8 shows the recoded data for question 12, each response value has been transferred to numerical values. 1-5% being 1, 6-10% being 2 and 11+% being 3.

Table 7: Results as descriptive statistics for question 11 (Would you be willing to pay more for a meal from a restaurant that had accessible allergen information on the food ordering website?).

Variable	Response	Total	
		Count	Percent
Question 11	1	92	67%
	2	45	33%

Table 8: Recode summary for question 12.

Original Value	Recoded Value
1-5%	1
6-10%	2
11+%	3

Table 9: Results as descriptive statistics for question 12 (If yes, how much more?)

Variable	Answer	Total Count	Percent
Question 12	None	45	33%
	1-5%	54	39%
	6-10%	22	16%
	11+%	16	12%

Table 9 shows that of those who would be willing to pay more, the majority (39%) would be willing to pay 1-5% more, followed by 6-10% (16%) and 11+% (12%).

Table 10: Results in the form of a cross tabulation for question 5 and question 11 ((Question 5: Would you feel more confident that allergens had been correctly identified and well managed by your chosen restaurant, if the allergen information online was clear and accessible?) (Question 11: Would you be willing to pay more for a meal from a restaurant that had accessible allergen information on the food ordering website?)).

		Question 11		
		Yes	No	All
Question 5	Yes	88	43	131
		67.18	32.82	100
		95.65	95.56	95.62
		64.23	31.39	95.62
	No	4	2	6
		66.67	33.33	100
		4.35	4.44	4.38
		2.92	1.46	4.38

Cell Contents
Count
% of Row
% of Column
% of Total

The crosstabulation in table 10 outlines that of those who said 'yes' to question 5, 67% also answered 'yes' to question 11. Of the total study population, 64% said 'yes' to both question 5 and question 11. So, just over half (64%) of those who would feel more confident that

allergens had been correctly identified if allergen information was clear and accessible would also be willing to pay more for a meal from their chosen restaurant.

The researcher intended to carry out a chi-square test for association between questions five and eleven. However due to the cell counts for some data being too small (e.g. only two participants responded 'no' to both Q5 and Q11) Minitab was not able to produce a valid output. As no P-value was able to be produced the results were invalid and so have not been included.

6.2 Survey 2 (Food business operator survey)

A total of 50 food businesses were contacted, at the time the survey closed one participant had responded. For this reason, the researcher is unable to comment on the results of survey 2 and subsequently unable to address aims 2.3 and 2.4.

7. Discussion

The current study comes after previous research projects highlighted gaps in food industry staff knowledge, as well as concerns from FA consumers in scenarios that involved ordering food not prepared in the home (Kwon et al. 2020, Barnett et al. 2020, Soon 2018, Wen & Kwon 2016). It further adds to the current body of research by investigating FA consumer experience when ordering food from 3rd party delivery sites, a particular experience that has been little documented.

The results demonstrate that the experiences of those with food allergies when ordering meals online for delivery are not always positive. Overwhelmingly high percentages (98%) of participants felt that there could be improvements made in allergen presentation and the current study identified that there were issues of trust and communication between restaurants and consumers. This was similarly found when Barnett (2020) summarised that FA consumers felt that trustworthy conversations are underpinned by good staff knowledge of ingredients and allergens (Barnett 2020).

Although the previous body of research around FA consumer experience when dining inside restaurants has been an important base for this research, the present study found that a significant proportion of participants (88%) felt there was a difference in the way allergens were presented online compared to dining in. The current study supported previous evidence noted by Begen (2016) that FA consumer prefer written information, with suggestions for improvements centring around allergen information being provided in written (or symbolic form) online as a pose to orally via the phone (Begen 2016).

Food industry staff lack perfect knowledge of food allergens and their risks (Wen & Kwon 2017, Loerbroks et al. 2019), this can impact FA consumer confidence when ordering. The issue of FA consumer confidence when ordering food not prepared in the home was

similarly highlighted in the current study. With avoidance being a key method of food allergy management (Sicherer 2011) the current finding that 96% of participants would feel more confident that a restaurant had correctly identified allergens if the online information was well presented is significant in improving FA consumer experience.

The present study provides evidence that the participants feel they are at a disadvantage when ordering from 3rd party delivery sites compared to non-food allergic consumers. The findings of this study are that participants felt the most disadvantaged when ordering during social situations. This is a similar theme highlighted by Barnett (2020) who identified that FA consumer conversations with restaurants about allergens are restricted out of fear of being labelled a 'fussy eater' (Barnett 2020).

When providing further detail into why participants felt disadvantaged, the most common answers included having less menu choice, with participants stating that they order the same 'again and again'. This solidifies findings by the American College of Allergy, Asthma and Immunology (2018) which included 'ordering foods with simple ingredients' as one of its top five reaction prevention strategies used by FA consumers (ACAAI 2018).

Previous research around responsibility highlighted that food industry staff felt that customers held the highest responsibility in preventing FA reactions, followed by kitchen staff and service staff (Wen & Kwon 2017). Correct allergen labelling online has the potential to prevent FA reactions. The current research apposed Wen and Kwon's (2017) findings, as here participants felt that it was the responsibility of the 3rd party site itself (91%) to provide allergen information.

The current study highlights the importance FA consumers put on being provided well presented, correct allergen information. Wen and Kwon (2016) found that food industry management felt that allergen training held 'low' significance in restaurant settings, however 67% of participants in the current study said that they would be willing to pay more for a meal where the allergen information online was presented correctly. Of those willing to pay more, 54% would have been willing to pay 1-5% more, followed by 6-10% (22%) more and 11+% (16%) more.

The current study also looked to explore food industry staff experiences with allergen presentation and accessibility on online delivery services, however the response rate was extremely low with only one valid response being recorded. This meant that the researcher was not able to discuss the findings from this perspective. This is also an area of research that is lacking and so the researcher anticipates that similar barriers in recruiting participants have been experienced.

8. Reflection on aims

Aim 2.1

The current research found that participants would feel increase confidence if there was an improvement in the way allergens were presented on online food delivery service websites.

Aim 2.2

The current research found that participants would be willing to pay more for a meal from a restaurant that had clear and accessible allergen information on online food delivery service websites.

Aims 2.3 & 2.4 were in relation to food business operators, the response rate for survey 2 was incredibly low with just one participant responding. To this end, the researcher is unable to make comments on aims 2.3 and 2.4.

9. Conclusion

Overall, the current study furthered research into FA consumer experience. It explored aims 2.1 and 2.2 by solidifying prior findings that FA consumer experience when ordering food outside of the home could be improved upon. Participants would feel more confident, and be willing to pay more for a meal from a restaurant that had clear and accessible allergen information on online food delivery websites.

The current study found that FA consumers face particular difficulty when ordering food online, so much so, that they feel at a disadvantage compared to their non-food allergic counterparts.

This research concludes that while the findings have added to the prior body of knowledge around FA consumer experiences, further research is required to explore fully and to this end recommendations have been made.

10. Critique & Recommendations

It is important to consider the limitations of research in order to interpret validity, context and credibility (Loannidis 2007).

The sample size was a limitation in this study, 137 useable responses meant that the results were not likely to be reliable and not representative of the entire food allergic population. Alongside the small sample size, voluntary bias is likely to have occurred. Only participants that interacted with Anaphylaxis UK and those who were reached as a result of snowballing had access to the surveys. Only including voluntary responses as a pose to random selection of participants has potentially skewed the results to only include those who feel strongly

about the topic.

Similarly to voluntary bias, sample bias is likely to also have occurred as the participants all interacted with Anaphylaxis UK (an allergy support charity) meaning that potentially the sample population may have been more inclined to take part in such research if they had negative experiences when ordering food online in the past.

The same sample recruitment method was not able to be used for both food allergic consumers and food industry staff. Although initial contact was made the same way, the researcher had no control over snowballing and so was not able to control the number of participants each survey reached.

Limitations were most notable in the response rate to survey 2, the extremely low response rate subsequently meant that the researcher was not able to make any comment regarding food business operator experiences and opinions in relation to the presentation of allergens online. The researcher observed that food industry staff were much less inclined to respond to invitations to participate, receiving only 1 participant response meant that no valid or reliable conclusions could be drawn.

In order to keep the questionnaires short and to ensure that no negative effects came from participating, some potentially interesting aspects were not included. For example, it would have been interesting to expand on the work of Kwon et al (2020) which looked to explore the amount of food allergic consumers that had experienced allergic reactions as a result of eating outside the home. This study could have furthered this by gathering information specifically regarding the number of participants that had experienced an allergic reaction as a results of consumer food ordered online for delivery.

It is recommended that future research is carried out in relation to food industry staff and their opinions on online allergy presentation. The researcher notes that the sample recruitment method for this demographic could be canvassed in order to potentially increase response rates, this way the researcher could have addressed any reservations perspective participants may have had. To further prompt food industry staff response, reassurance around confidentiality might have helped, participation from third party services themselves may also have increased food industry staff confidence in participation.

Overall, future research to further explore both food allergic consumer and food industry staff experiences and opinions is recommended. Following the findings in the current research, it is also recommended that policy change and legislation is implemented to improve the presentation and consistency of allergen information on online food delivery websites.

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Appendix 1 – Participant invitation emails.

To: info@anaphylaxis.org.uk; admin@anaphylaxis.org.uk

Dear Anaphylaxis Campaign,

I hope you are well.

I am currently working as a Trainee Environmental Health Officer and completing my degree in Environmental Health at Middlesex University.

I am interested in researching food allergies and I hope to centre my final year dissertation around this topic.

I am particularly interested in the way online food delivery services (e.g. Just Eat) manage allergens and whether an improvement in the accessibility of allergen information would increase consumer confidence.

I would be looking to gather data from food allergic consumers via a short questionnaire.

Would it be possible to send you a copy of my dissertation questionnaire to put in your newsletter/blog in order for me to gather such data?

Please give me a call on: [REDACTED] or let me know if you would like me to set up a call/zoom to discuss any details further.

Kind regards,

Nanci Pomfrett

Food allergen research invitation

To: [REDACTED]

Dear Sir/Madam,

I hope this email finds you well.

I am a third year Environmental Health student at Middlesex University. I am currently undertaking my final year project and I would like to invite you to take part.

The research looks to gather data from food business operators who use online ordering services, e.g. Just Eat.

Below is a link to my survey (with covering participant information sheet), I expect this to take no longer than 2-5 minutes:

https://mdxl.eu.qualtrics.com/jfe/form/SV_9HVUecvyPHHFGiW

Online Survey Software | Qualtrics Survey Solutions

The most powerful, simple and trusted way to gather experience data. Start your journey to experience management and try a free account today.

mdxl.eu.qualtrics.com

Please be aware that no personal data will be collected, and the link is not able to track or record personal data from participants.

If you do choose to take part, and know others that may be interested, please feel free to forward this email, or share this information on your social media platforms in order for others to participate.

Thank you for taking the time to read this email.
If you have any queries, please do not hesitate to contact me.

Kind regards

Nanci Pomfrett

Appendix 2 – Participant information sheet.

Before deciding whether to participate, please read the following information.

Please note that this study looks to gather information from participants who use online ordering websites, e.g. Just Eat. Thank you.

Invitation

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the project/study?

To investigate whether consumers with a food allergy/intolerance feel that allergen presentation on online food ordering websites (e.g. Just Eat) is suitable, and if such consumers would be willing to pay more for a meal where the allergen information had been well presented and was accessible. As well as this, to investigate if it is felt that there is a responsibility on the online ordering sites to provide allergen information and to establish if food business operators feel that allergen presentation/accessibility on on-line food delivery websites (e.g. Just Eat) is suitable.

Why have I been chosen?

It is important that we assess as many participants as possible, and you have indicated that you are interested in taking part in this study. You have been chosen because you have a food allergy and/or intolerance or you are a food business operator.

Do I have to take part?

It is up to you to decide whether or not to take part. You can withdraw from the study at any time. It may not be possible to withdraw specific answers (to questions) that you give since no personal data will be collected to identify you and your answers.

What will I have to do?

You will be asked to give answers to questions in a questionnaire. This is expected to take 2-5 minutes.

What are the possible risks or benefits of taking part?

There are no known risks in participating in this project. We hope that participating in the study will help you. However, this cannot be guaranteed. The information we gather from this study may help us to identify concern for the way allergens are presented online and identify whether food business operators share this concern.

Data Protection and Confidentiality

Personal data (*e.g. your name, email address, voice or any data that can identify you*) will NOT be collected by this study and your confidentiality will be protected.

What will happen to the results of the research study?

The results of the research study will be used as part of an Undergraduate dissertation. The results may also be presented at conferences or in journal articles.

Who has reviewed the study?

The study has received full ethical clearance from the Research Ethics Committee (REC) who reviewed the study. The committee is the Natural Sciences REC.

Contact for further information

If you require further information, have any questions or would like to withdraw your data then please contact:

Nanci Pomfrett – NP734@live.mdx.ac.uk

Supervisor – Adam Choonara – a.choonara@mdx.ac.uk

Appendix 3 – Survey 1

CONSENT STATEMENT

I have read and understood the participant information above and by answering questions in interviews/questionnaires, I freely and voluntarily give my consent to participate in this project/study.

- 1) Do you feel there is a difference in the way allergens are managed through online ordering partners (E.g. Just Eat) compared to dining inside the restaurant?

Yes No

If Yes – what difference?

- 2) Do you think the presentation and accessibility of allergen information on online ordering services could be improved upon?

Yes No

If Yes, how?

- 3) Would you feel more confident that allergens had been correctly identified and well managed by your chosen restaurant, if the allergen information online was clear and accessible?

Yes No

If No, please provide further detail.

- 4) Do you feel that online ordering services (E.g. Just Eat) have a responsibility to provide allergen information for meals?

Yes No

Please provide further detail, e.g. why?

- 5) Do you feel that you are put at a disadvantage when ordering from third party sites, compared to non-allergic consumers?

Yes No

If Yes, how so?

Would you be willing to pay more for a meal from a restaurant that had accessible allergen information on the food ordering website?

Yes No

- if Yes, how much more?

1-5%

6-10%

11+%

Thank you for taking the time to answer this questionnaire.

Appendix 4 – Survey 2

CONSENT STATEMENT

I have read and understood the participant information above and by answering questions in interviews/questionnaires, I freely and voluntarily give my consent to participate in this project/study.

- 1) What is your role within the food business you are associated with? E.g. manager, owner.
- 2) What type of food do you serve?
- 3) Do you feel that allergen information/ingredients lists from your meals are accessible via the online ordering platform?
Yes No
- 4) Do you feel that there could be improvement made to third party ordering websites in terms of the way that allergen information is presented?
Yes No
- 5) Do you think an improvement would increase food allergic customer confidence when ordering online?
Yes No
- 6) Do you feel that online ordering services (E.g. Just Eat) have a responsibility to provide allergen information for meals?
Yes No
- 7) Do you feel that improvements in the accessibility of allergens on online ordering websites would increase/widen your customer base?
Yes No