

The impact of Covid-19 restrictions and changes to takeaway regulations in England on consumers' intake of, and method of accessing out-of-home foods: a longitudinal, mixed-methods study

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Abstract: Background: COVID-19 restrictions significantly impacted the operations of Fast Food and Full Service retailers. Full Service retailers were permitted to operate as takeaway outlets without needing to seek formal changes in planning permissions. We conducted a study to determine consumers' intake of, and mode of accessing foods from Fast Food and Full Service retailers during various Covid-19 restrictions and changes to takeaway/delivery regulations, and their experiences of this. Methods: We conducted a longitudinal, mixed-methods study comprising three surveys examining intake frequency and modes of accessing retailers, and two rounds of qualitative focus groups exploring related experiences. Data were collected from May 2021 – March 2022. Participants were adults living in Northern England (n = 701 at T1); a sub-sample participated in focus groups (n = 22). Intake data were presented descriptively; an ordered logit regression explored factors associated with intake frequency. Focus group data were analysed using Framework Analysis. Results: Mean weekly intake frequency from Fast Food retailers at T1, T2 and T3 was 0.96 (SD 1.05), 1.08 (SD 1.16) and 1.06 times (SD 1.12), respectively. For Full Service retailers, this was 0.36 (SD 0.69), 0.75 (1.06) and 0.71 (SD 0.99) times, respectively. Food access issues (OR (SE): T1 = 1.65 (0.40), T2 = 2.60 (0.66), T3 = 2.1 (0.62)) and obesity (T1 = 1.61 (0.31), T2 = 2.21 (0.46), T3 = 1.85 (0.42)) were positively associated with intake from Fast Food, but not Full Service retailers. Delivery services were commonly used to access Fast Food (30–34% participants), but not Full Service retailers (6–10% participants). As Covid-19 restrictions eased, participants were eager to socialise on-premises at Full Service retailers. Conclusions: Takeaway/delivery services were seldom used to access Full Service retailers; use of delivery services to access Fast Food was high. Policy-makers must recognise delivery services as a growing part of the food environment, and the challenges they pose to planning policies for obesity prevention.

Keywords: Food delivery services; takeaway; fast food; food environment; town planning; obesity

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1. Introduction

On 23rd March 2020, England entered its first national 'lockdown' to attenuate the spread of Covid-19 [1]. Legally enforced 'stay-at-home' orders meant that people should only leave their homes for essential activities, and non-essential businesses were not permitted to conduct on-premises trade [1]. Since then, Covid-19 restrictions in England have fluctuated [2] in response to factors including case numbers, hospitalisation rates and disease severity among others. These restrictions had a particularly large impact on the out

of home (OOH) food sector and affected both dine-in (food eaten on-premises) and take-away/delivery (food eaten off-premises) operations. Regarding dine-in, between intermittent national and local lockdowns during which they were prohibited, phased reopening of dine-in services was accompanied by varying public health measures [2]. For instance, retailers were only able to accommodate patrons in outdoor spaces, and patrons were required to wear face coverings while not seated, adhere to social distancing, restrict social contact between households ('Rule of Six'), and 'check-in' to venues on the NHS Covid-19 app. In February 2022 the UK Government moved to the 'Living with Covid-19' plan where all legal limits on business operations and social contact were abandoned [3].

With regards to takeaway and delivery operations, in March 2020 the Ministry of Housing, Communities and Local Government announced temporary changes to town planning regulations that allowed retailers, cafes, pubs and bars (A3 and A4 Use Class retailers [4], herein collectively referred to as Full Service retailers) to use 'enhanced' takeaway and delivery services without seeking formal changes in planning permissions [5], meaning most food sold could be 'taken away' to be eaten off-premises. Prior to the pandemic, Full Service retailers only used takeaways/delivery services in a supplementary capacity; 'enhanced' use of these services was reserved for hot food takeaways (A5 Use Class 1; herein referred to as Fast Food retailers) only. While these changes to planning regulations were introduced to support 'stay-at-home' orders and preserve the economy and employment, town planning and public health stakeholders expressed concern that they were incompatible with public health agendas and may have implications for population-level weight gain by facilitating access to OOH foods [6]. These concerns are plausible given that greater access to OOH foods, characteristically very high in energy [7, 8], has been linked to greater consumption and higher BMI in some studies [9, 10]. For instance, a population-based, cross-sectional study found that objectively measured exposure to home, workplace and commuting route food environments were associated with marginally higher consumption of takeaway food, greater body mass index, and greater odds of obesity, with evidence of a dose-response effect [10]. Given the association of obesity and socioeconomic deprivation [11], and that density of Fast Food outlets is greater in areas with higher deprivation levels in the UK, such as northern England [12], negative health repercussions of policies affecting access to OOH foods may be more pronounced in areas of greater deprivation.

Understanding how changes to takeaway regulations and various Covid-19 restrictions over the course of the pandemic in the UK may have impacted how often consumers ate foods from different OOH retailers, how they accessed them, and associations with sociodemographic factors would help inform policies on the OOH food sector and future crisis planning. To our knowledge, no previous UK-based studies have aimed to explore this. While survey studies have quantified OOH intake during the pandemic, they have not been conducted over sufficient timeframes to explore the impact of various restrictions [13-15], nor have they differentiated intake from different types of OOH retailers [13, 16-17]. We are not aware of any studies that have investigated how consumers accessed OOH retailers across the course of the pandemic, nor consumers' use of the newly introduced 'enhanced' takeaway services for Full Service retailers. One UK-based study did aim to explore associations between changes in BMI and different food outlets/methods of delivery in a small sample of UK adults (n = 60) [18]. However, type of food outlets were reported as: Fast Food Restaurants, Full Service Restaurants, delivery or takeaways. These options conflate retailer type with method of access as both types of retailers could operate as 'takeaways' during the pandemic, limiting confidence in the findings. Also, notwithstanding one mixed-methods study exploring consumers' experiences of home-cooking and eating out in the UK during the first months of lockdown [19], we are not aware of any other qualitative work exploring consumers' perceptions and experiences of using the OOH food sector and new takeaway services during various Covid-19 restrictions across the course of the pandemic.

Therefore, we co-conceived a study with public health stakeholders in Northern England that aimed to investigate the use of OOH food retailers by consumers in Northern England during various Covid-19 restrictions and changes to takeaway regulations from May 2021 to March 2022. The specific objectives were:

1. To determine the frequency of intake from Fast Food and Full Service retailers;
2. To determine the association of intake from Fast Food and Full Service retailers with sociodemographic characteristics to understand variation across the socioeconomic spectrum;
3. To determine how food from Fast Food and Full Service retailers was accessed and why;
4. To explore consumers' experiences and perspectives of using OOH food retailers.

2. Materials and Methods

2.1. Research paradigm and study design

As our research objectives lend themselves to both positivist (objective, quantitative) and interpretivist (subjective, qualitative) paradigms we selected a pragmatic paradigm; pragmatism acknowledges that research inquiries can be answered by drawing on different research paradigms [20] and through use of quantitative, qualitative, and mixed research [20]. We conducted a longitudinal mixed-methods study comprising three online quantitative surveys and two rounds of qualitative focus groups conducted with adults residing in Northern England (Figure 1). A convergent parallel mixed-methods design was used, in which qualitative and quantitative data were collected in parallel, analysed separately, and then merged [21]. This was done at a slight lag as the initial survey was used to identify potential focus group participants.

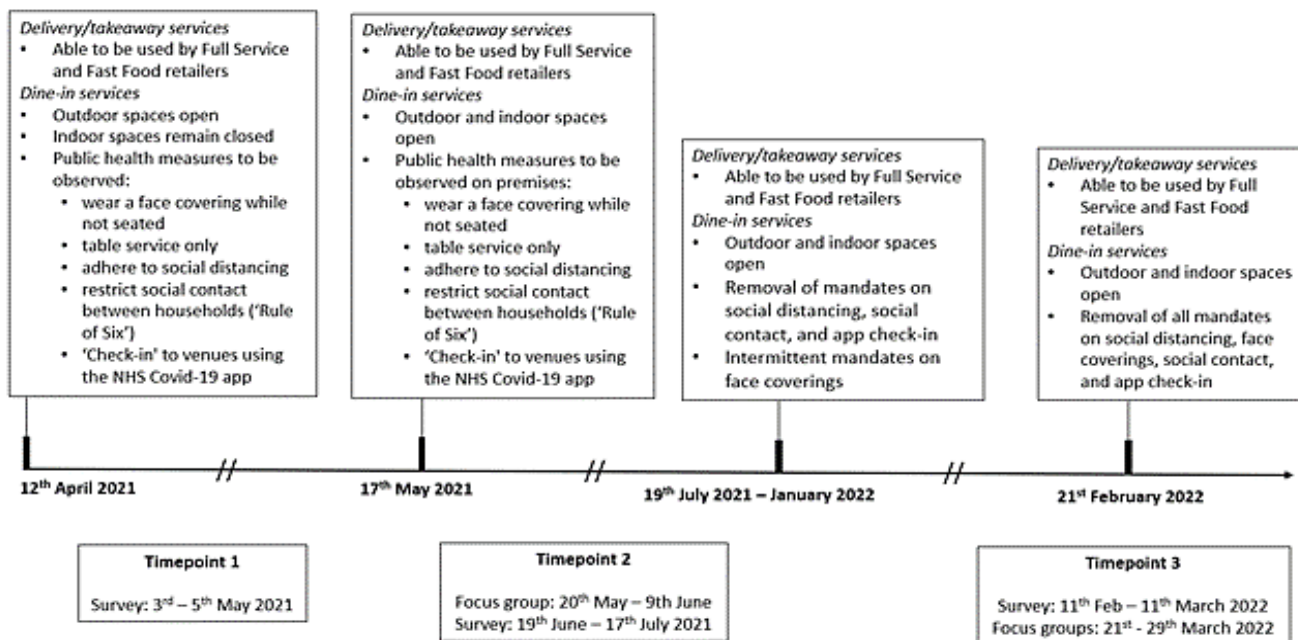


Figure 1. Timeline of study data collection and Covid-19 restrictions and adaptations affecting OOH Fast Food and Full Service retailers in England from April 2021 – March 2022.

2.2. Study context

The study period was from May 2021 to March 2022, during which time Covid-19 restrictions affecting the OOH food sector in England fluctuated. At data collection timepoint 1 (T1) from 3rd – 5th May 2021, OOH retailers were allowed to provide dine-in services in outdoor spaces only [2]. Patrons were required to wear face coverings while

not seated at a table, use table service only, adhere to social distancing, restrict social contact between households ('Rule of Six'), and 'check-in' to venues using the NHS Covid-19 app. At Timepoint 2 (T2) from 20th May – 17th July 2021 indoor spaces were also reopened, and public health measures were still enforced [2]. At Timepoint 3 (T3) from 11th February – 29th March 2022, the UK Government had moved to the Living with Covid-19 plan and all legal limits on OOH business operations and social contact were abandoned [3]. With regards to takeaway/delivery operations, both Fast Food and Full Service retailers were able to use these services throughout the study period i.e. both were able to sell most food as 'takeaway' to be eaten off-premises.

2.3. Surveys

2.3.1. Procedure

The survey was piloted before formal data collection and amended according to feedback. Participants were invited to complete the baseline survey at T1; those who completed it were invited to complete follow-up surveys at T2 and T3. Relative to the survey administered at T1, surveys administered at T2 and T3 were live for longer to maximise participant response rate. Each participant was paid £2.25 for completing the survey at T1 (the equivalent of £9.00/hour for a 15-minute survey) and £1.55 for completing surveys at T2 and T3 (the equivalent of £9.30/hour for a 10-minute survey). Payment was submitted directly to participants via Prolific [22], an online platform that connects researchers with participants.

2.3.2. Participant recruitment and sampling

All study participants were recruited via Prolific [22] and all participants provided their consent before commencing each survey. Participants were ≥ 18 years and living in Northern England. Recruitment was stratified in Prolific by age (18-24 years, 25-49 years, 50 years and over), sex (male/female), and annual household income ($< \pounds 30,000$ disposable household income, $\geq \pounds 30,000$ disposable household income informed by income by region [23]). As analyses were exploratory, we did not conduct a formal power analysis, and we aimed for a sample size of 700 participants. A retrospective sample size calculation was conducted and showed that a sample of $n = 700$ would be sufficient to achieve a 5% margin of error with a 99% confidence interval. Also, as a rule of thumb, for the statistical analysis we employ such as an ordered logit, a sample of $n = 500$ is the minimum size required to estimate the parameters [24]. Therefore, our sample should be adequate to estimate the associations we are investigating [24].

2.3.3. Measures

An overview of data collected at each timepoint is shown in **Table 1**. Participants' age, sex and annual household income was provided via Prolific. The study survey administered at T1 (**Supplementary File 1**) collected other demographic measures and habitual health behaviours including self-reported height and weight, annual household income (the mean and median household incomes in 2019-20 for North East England were £23,800 and £30,000, respectively [23]), employment status, ethnicity, education (A-levels are a UK high school leaving qualification), experience of issues accessing foods due to financial constraints using the three-item US Department of Agriculture household food insecurity screener [25].

Participants reported their usual fruit and vegetable intake via relevant items of the Short Form Dietary Questionnaire [26], usual alcohol intake via the Alcohol Use Disorders Identification Test Consumption (AUDIT C) [27] and usual physical activity via the International Physical Activity Questionnaire (IPAQ) short [28]. All these are validated instruments and are widely used in health research to measure health behaviours. Participants then reported the frequency with which they consumed hot foods from OOH food retailers in the previous 7 days and how these foods were accessed (delivery, dine-in,

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Table 1. Survey data collected at three data collection time points (T).

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Title 1	T1	T2	T3
Demographics	X		
Fruit and vegetable intake in preceding 7 days (SFFFAQ)	X		
Pre-pandemic frequency of eating from different retailers	X		
Usual alcohol intake (AUDIT-C)	X		
Alcohol intake in preceding 7 days (modified AUDIT-C)	X	X	X
Physical activity in preceding 7 days (IPAQ short)	X	X	X
Frequency of eating from Fast Food and Full Service retailers in preceding 7 days	X	X	X
Use of dine-in, delivery or takeaway services in preceding 7 days	X	X	X

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takeaway). As we wanted to explore the use of newly introduced ‘enhanced’ takeaway and delivery services by Full Service retailers, OOH food retailers were dichotomised into Fast Food retailers (historically able to use ‘enhanced’ takeaway and delivery services) and Full Service retailers (able to use ‘enhanced’ takeaway and delivery services since March 2020). Written descriptions and images of these two groups of retailers were provided to help participants differentiate them. Instructions made explicit that we were interested in intake of hot foods only, and not cold items such as crisps or confectionary. In the follow-up surveys at T2 and T3, participants reported their use of Fast Food and Full Service retailers, methods of accessing retailers, alcohol use and physical activity over the previous 7 days. All surveys included attention check questions to identify any participants responding randomly.

2.3.4. Data analysis

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We present descriptive analysis in which we estimate means for all variables. For continuous variables only (age, BMI, and MET hours per week of physical activity), standard deviations are estimated. Continuous variables are interpreted as natural units whereas binary variables can be interpreted as percentages. Next, we employed an ordered logit regression to explore the factors associated with increased frequency of consuming food from Fast food and Full Service retailers over the study period. This shows the association between different levels of consumption of food from fast food and Full Service retailers and individual characteristics over the study period (the variables outlined in the descriptive statistics).

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2.4. Focus groups

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2.4.1. Procedure

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All focus groups took place via a video conferencing platform (Microsoft Teams) and were audio and video recorded. Groups were facilitated by MF and SS; both female research fellows educated to PhD level with moderate to extensive experience in conducting qualitative research. MF has a dietetics background and interest in obesity management/prevention; SS has a social science background with an interest in health inequalities. Participants were not known to researchers before the study and were not explicitly informed of the researchers’ academic backgrounds or interests. Throughout the research

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process, researchers reflected on their own experiences, interests, and views and how these might influence the conduct of the study, especially the analysis and interpretation of focus group data. To ensure that online discussion was manageable, focus groups were limited to a maximum of six participants. Participants could join using audio only or by using both video and audio. All focus groups were steered by a topic guide (**Supplementary File 2**), which was initially devised in consultation with regional stakeholders and guided by both existing literature and survey questions. This topic guide was iterative, allowing space to continually re-evaluate emergent findings and perspectives. All participants were provided with a study information sheet and provided written, informed consent to take part before each focus group.

2.4.2. Participant recruitment and sampling

Participants indicated their interest in participating in a focus group at the end of the survey completed at T1. Focus group participants were identified using maximum variation purposive sampling based on age, gender, and annual household income. All focus group participants who took part at T3 had previously taken part at T2, making these repeat focus groups. Focus group participants received a payment of £15 per focus group, which was again submitted directly to their Prolific account. At both time points, focus groups continued to data saturation, whereby existing themes were consistently repeated, and no new themes were drawn from the data [29].

2.4.3. Data analysis

Focus group recordings were transcribed verbatim and anonymised. Transcripts were analysed using the five iterative stages of Framework Analysis outlined by Ritchie and Spencer [30]: 1. Familiarisation, 2. Identifying a thematic framework, 3. Indexing, 4. Charting, and 5. Mapping and interpretation. Codes were generated inductively and deductively as informed by the focus group topic guide. Transcripts were coded independently by MF and SS, firstly line-by-line and then systematically indexed into data tables to generate candidate themes. Candidate themes were discussed and challenged at subsequent project meetings, and were compared to identify patterns, similarities and differences in the data, in order to generate analytical themes, and a consistent interpretation of the dataset as a whole. As the data were longitudinal, we used a recurrent cross-sectional analysis; this allowed us to explore the evolution of group-level themes over time, rather than the trajectories of individual participants [31].

2.5. Data integration

We used a side-by-side comparison approach to integrate the datasets of the convergent parallel design, as outlined by Creswell and Clark [21]. First, each dataset was analysed separately, then we compared our analysis of survey data with the analysis of focus groups, identifying common concepts and convergence or divergence in findings. We have grouped our findings under subheadings broadly based on our research objectives. Depending on the nature of the objective and in line with the pragmatic research paradigm, these contain quantitative survey data, qualitative focus group data, or both to elaborate on or corroborate findings from both data sources. Further data integration occurs in the Discussion section to offer overarching take-home messages and/or formulate recommendations for policy and practice. To help illustrate findings, we have included graphs and quotations to provide rich description and faithful accounts of the views and experiences of participants in this study.

3. Results

3.1. Participants

3.1.1. Survey

A total of 874 participants were recruited at T1. Of these, 173 participants did not submit a complete survey, resulting in a sample of 701 participants at T1. Sample characteristics are reported in **Table 2**. The proportion of men and women (49.9%) was roughly equal, most participants were white (90.6%), and around one-third (35.8%) had a basic level of education (high school or lower). The proportion of participants who had difficulty accessing food for financial reasons ranged from 8.6 -14.7% depending on the definition used (see Table 2 footnote). At baseline, 142 participants (20.3%) reported not drinking alcohol at all. Of those that reported drinking, 278 (49.7%) participants were classified as low risk drinkers, 267 (47.8%) as increasing and higher risk drinkers, and 12 (2.5%) as having possible dependence. Of the 701 participants in the initial sample, 615 (87.7%) and 490 (69.9%) participants completed the survey at T2 and T3, respectively. At T2 and T3, participant composition remained similar to T1, however, less women and younger people responded in later waves.

3.1.2. Focus groups

At T2, six focus groups were conducted with 22 participants consisting of 2-6 participants per group. The sample consisted of 10 male and 12 females with a mean age of 40 years (range = 21-65 years). Ten participants (45%) had an annual household income below the median annual earnings for full-time employees in Northern England [32] (**Table 3**). One participant was shielding since March 2020. Each focus group discussion lasted between 49 and 62 minutes. At T3, three focus groups were conducted with 12 participants of the original sample. The sample consisted of equal numbers of male and female participants with a mean age of 45 years (range = 24-62 years). Three participants (25%) had an annual household income below the median annual earnings for full-time employees in Northern England [32]. Focus groups at T3 ran between 32 to 53 minutes.

3.2. Intake frequency of OOH foods

The greatest proportion of participants reported that intake from both Fast Food (39.0%) and Full Service (28.6%) retailers before the pandemic was 1-2 times per month (Figure 2). Overall, pre-pandemic intake from Fast Food retailers was more frequent than intake from Full Service retailers (**Figure 2**). Similarly, at all three survey time points, intake from Fast Food retailers was greater than that from Full Service retailers (Figure 3a and 3b). Mean weekly intake frequency from Fast Food retailers at T1, T2 and T3 was 0.96 (SD 1.05), 1.08 (SD 1.16) and 1.06 times (SD 1.12), respectively. For Full Service retailers, mean weekly intake frequency was 0.36 (SD 0.69), 0.75 (1.06) and 0.71 (SD 0.99) times, respectively. Frequency distribution of intake from both retailer types at each timepoint is presented in **Figures 3a** and **3b**.

3.3. Intake of OOH foods across sociodemographic groups

Survey data showed that several participant characteristics were consistently associated with intake frequency from different retailers across all three timepoints (**Table 4** and **Table 5**). Participants aged 18-24 years old used both Fast Food and Full Service retailers significantly more than participants in other age groups at all three timepoints. Likewise, those who experienced food access issues ate from Fast Food retailers 1.65 (SE 0.40), 2.60 (SE 0.66), and 2.1 (SE 0.62) times more than those without food access issues at T1, T2 and T3, respectively. Participants with obesity used Fast Food retailers 1.61 (SE 0.31) (T1), 2.21 (0.46) (T2), 1.85 (0.42) (T3) times more than participants with a healthy BMI. Neither food access issues nor obesity status were associated with use of Full Service retailers. At T1, carers used Fast Food retailers 3.5 (SE 1.3) times more than non-carers. The reason for this was explored somewhat in focus groups discussions. While they did not identify as 'carers' per se, several female participants with children mentioned that competing domestic and childcare duties took time and cognitive resource away from meal preparation, leading them to opt for Fast Food as a quick and easy alternative.

Table 2. Characteristics of survey participants at three survey timepoints.

	T1 n = 701	T2 n =615	T3 n = 490
Women (%)	49.9	49.8	47.4
Age (years (SD))	36.0 (14.2)	36.5 (14.3)	38.7 (14.6)
<i>Age groups</i>			
18-24 years (%)	29.2	27.4	21.8
25-49 years (%)	50.8	52.0	52.5
50 years and over (%)	20.0	20.6	25.7
<i>Region</i>			
North East, England	70.3	70.0	73.1
North West, England	29.7	30.0	26.9
White ethnic background (%)	90.6	90.5	92.7
<i>Employment status</i>			
Full time employed (%)	45.5	44.9	45.3
Part time employed (%)	19.1	20.2	21.0
Unemployed (%)	10.1	10.3	10.0
Full time student (%)	16.0	15.8	11.8
Part time Student (%)	2.9	2.9	2.4
Carer and other (%)	6.4	5.9	9.5
A-level or lower (%)	35.8	35.2	35.3
<i>Issues with access to food</i>			
Definition 1 (%) ^a	14.7	14.3	13.3
Definition 2 (%) ^b	8.6	8.3	7.9
<i>Annual household income</i>			
Less than £16,000 (%)	21.4	20.4	21.0
£16,000 - £29,999 (%)	29.7	30.3	30.2
£30,000 - £49,999 (%)	26.5	26.8	23.3
£50,000 and over (%)	22.4	22.5	25.5
BMI (kg/m ² (SD)) ^c	26.9 (sd = 6.6)	26.9 (sd=6.6)	27.1 (sd=6.6)
Obesity (%)	26.8	26.8	29.0
Meeting 5-a-day Fruit and Vegetable serving guideline (%)	30.2	32.0	31.7
MET hours per week of physical activity ^d	48.3 (sd = 45.5)	46.5 (sd=41.3)	48.3 (sd=45.5)
Able to have food delivered by delivery service e.g. Just Eat (%)	96.0	96.0	95.6

^a Answered 'Often True' or 'Sometimes True' to any of the items "I/we worried whether my/our food would run out before I/we got money to buy more", "The food that I/we bought just didn't last, and I/we didn't have money to get more" and "I/we couldn't afford to eat balanced meals."

^b Answered 'Often True' or 'Sometimes True' to any two of the items "I/we worried whether my/our food would run out before I/we got money to buy more", "The food that I/we bought just didn't last, and I/we didn't have money to get more" and "I/we couldn't afford to eat balanced meals."

^c n= 698 at Survey 1.

^d Physical activity includes time spent walking, and in moderate and vigorous physical activity.

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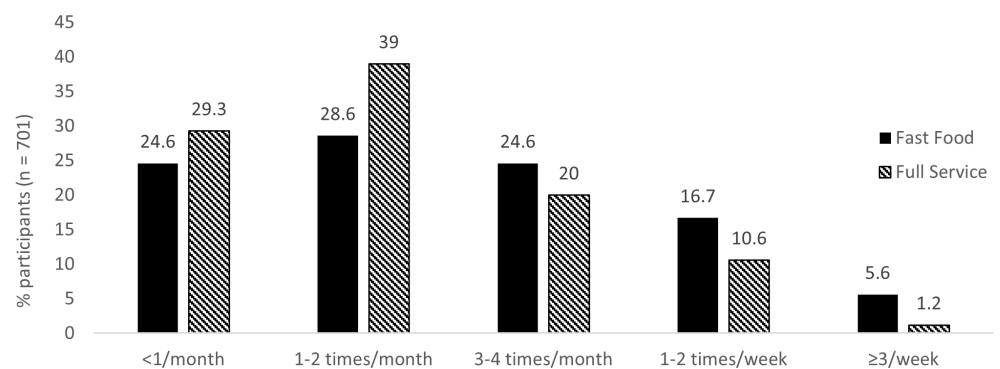
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Table 3. Characteristics of focus group participants at T2 and T3.

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	T2 n = 22	T3 n = 12
Women (n; %)	12; 55	6; 50
<i>Age group (n; %)</i>		
< 30 years	9; 41	3; 25
30-39 years	2; 9	0; 0
40-49 years	3; 14	3; 25
50-59 years	4; 18	4; 33
≥ 60 years	4; 18	2; 17
<i>Annual household income (n; %)</i>		
< £10,000	2; 9	0; 0
£10,000 – £19,999	4; 18	2; 17
£20,000 – £29,999	4; 18	1; 8
£30,000 – £39,999	3; 14	1; 8
£40,000 – £49,999	2; 9	3; 25
£50,000 – £99,999	5; 23	5; 42
≥ £100,000	2; 9	0; 0

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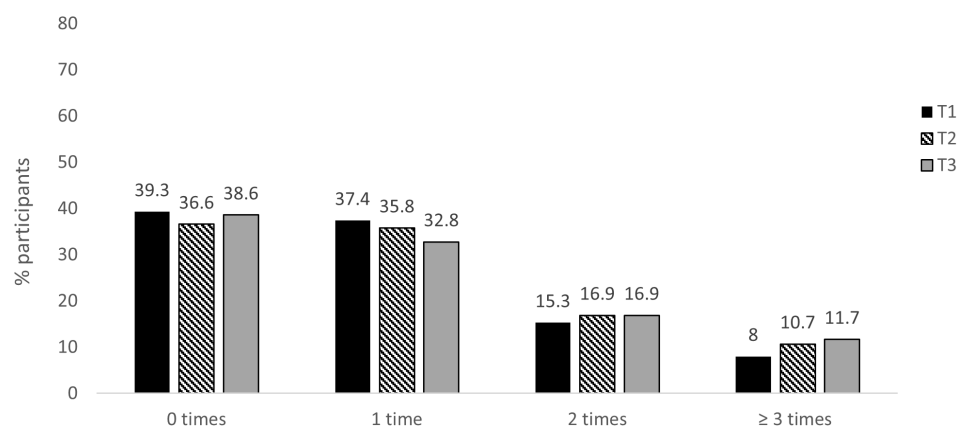
Figure 2. Frequency of intake from Fast Food and Full Service retailers before the pandemic.

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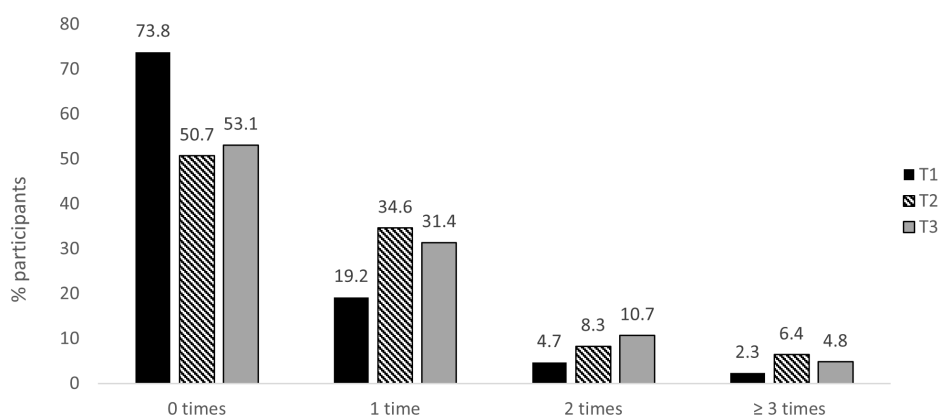
(a)



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Figure 3. Weekly intake frequency across time points of foods from (a) Fast Food retailers, and (b) Full Service retailers. Timepoint 1 (T1) from 3rd – 5th May 2021: dine-in services in outdoor spaces only, public health measures enforced on-premises; Timepoint 2 (T2) from 20th May – 17th July 2021: indoor spaces reopened, public health measures enforced on-premises; Timepoint 3 (T3) from 11th February – 29th March 2022: all legal limits on OOH retailers abandoned. Takeaway/delivery services were available both for Fast Food and Full Service retailers at all time points.

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Table 4. Ordered Logit Model of Determinants of Eating from Fast Food Retailers Once or More a Week.

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	T1	T2	T3
18-24 years old	Reference	Reference	Reference
25-49 years old	0.486*** (0.111)	0.478*** (0.121)	0.522** (0.158)
50 and older	0.177*** (0.0510)	0.164*** (0.0509)	0.225*** (0.0791)
North East	Reference	Reference	Reference
North West	0.767 (0.154)	1.211 (0.259)	1.386 (0.334)
Degree or higher	Reference	Reference	Reference
A level or lower	1.040 (0.172)	1.390* (0.246)	0.946 (0.184)
Healthy BMI	Reference	Reference	Reference
Overweight BMI	1.193 (0.229)	1.186 (0.239)	1.176 (0.271)
Obese BMI	1.607** (0.310)	2.212*** (0.460)	1.846*** (0.420)
Household income <£16k	Reference	Reference	Reference
£16-29K	1.044 (0.255)	1.431 (0.376)	1.188 (0.345)
£30-49K	1.383 (0.352)	1.521 (0.418)	1.317 (0.396)
£50K or greater	1.651* (0.444)	1.558 (0.453)	1.097 (0.353)
No food access issues	Reference	Reference	Reference
Food access	1.652** (0.400)	2.597*** (0.661)	2.107** (0.619)
Not in employment/Other	Reference	Reference	Reference
Full time employed	1.516* (0.369)	1.385 (0.353)	1.605 (0.466)

Part time employed	1.242 (0.312)	0.990 (0.257)	1.224 (0.352)
Student	1.199 (0.324)	0.881 (0.251)	1.243 (0.471)
Carer	3.510*** (1.318)	1.094 (0.422)	1.936 (0.856)
Male	Reference	Reference	Reference
Female	0.967 (0.163)	1.153 (0.208)	0.896 (0.180)
/cut1	0.469 (0.259)	0.683 (0.441)	0.784 (0.543)
/cut2	3.076** (1.701)	4.123** (2.670)	4.004** (2.789)
/cut3	12.02*** (6.812)	13.93*** (9.132)	12.60*** (8.921)
Observations	599	550	427

Results presented as odds ratios (standard error); figures in bold-type indicate statistical significance at $p < 0.05$; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Timepoint 1 (T1) from 3rd – 5th May 2021: dine-in services in outdoor spaces only, public health measures enforced on-premises; Timepoint 2 (T2) from 20th May – 17th July 2021: indoor spaces reopened, public health measures enforced on-premises; Timepoint 3 (T3) from 11th February – 29th March 2022: all legal limits on OOH retailers abandoned. Takeaway/delivery services were available both for Fast Food and Full Service retailers at all time points.

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Table 5. Ordered Logit Model of Determinants of Eating from Full Service Retailers Once or More a Week.

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	T1	T2	T3
18-24 years old	Reference	Reference	Reference
25-49 years old	0.574** (0.149)	0.449*** (0.119)	0.553* (0.175)
50 and older	0.336*** (0.116)	0.375*** (0.118)	0.399*** (0.141)
North East	Reference	Reference	Reference
North West	0.683 (0.167)	1.289 (0.293)	0.914 (0.233)
Degree or higher	Reference	Reference	Reference
A level or lower	0.636** (0.133)	0.951 (0.175)	0.818 (0.167)
Healthy BMI	Reference	Reference	Reference
Overweight BMI	1.070 (0.243)	0.913 (0.190)	1.140 (0.268)
Obese BMI	0.840 (0.203)	0.905 (0.195)	1.271 (0.298)
Household income <£16k	Reference	Reference	Reference
£16-29K	1.334 (0.402)	1.637* (0.445)	1.036 (0.313)
£30-49K	1.305 (0.406)	1.796** (0.524)	1.288 (0.402)
£50K or greater	1.320 (0.427)	2.406*** (0.731)	1.925* (0.646)
No food access issues	Reference	Reference	Reference
Food access	1.077	1.609*	1.245

	(0.318)	(0.433)	(0.384)
Not in employment/Other	Reference	Reference	Reference
Full time employed	1.175 (0.344)	1.329 (0.348)	1.340 (0.392)
Part time employed	1.024 (0.312)	1.546 (0.416)	1.035 (0.307)
Student	1.095 (0.346)	1.499 (0.454)	1.498 (0.571)
Carer	0.207** (0.158)	0.849 (0.361)	1.035 (0.436)
Male	Reference	Reference	Reference
Female	1.241 (0.247)	1.300 (0.248)	1.130 (0.234)
/cut1	1.610 (1.032)	2.303 (1.480)	1.059 (0.759)
/cut2	7.042*** (4.583)	16.41*** (10.75)	5.653** (4.082)
/cut3	22.68*** (15.49)	53.15*** (35.92)	21.48*** (16.04)
Observations	599	524	427

Results presented as odds ratios (standard error); figures in bold-type indicate statistical significance at $p < 0.05$; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Timepoint 1 (T1) from 3rd – 5th May 2021: dine-in services in outdoor spaces only, public health measures enforced on-premises; Timepoint 2 (T2) from 20th May – 17th July 2021: indoor spaces reopened, public health measures enforced on-premises; Timepoint 3 (T3) from 11th February – 29th March 2022: all legal limits on OOH retailers abandoned. Takeaway/delivery services were available both for Fast Food and Full Service retailers at all time points.

“I’m so busy doing everything else, it tends to be now we will just go to McDonald’s on the way home and then just grab something quick and easy in our house usually means something that’s like full of calories and fat just because it’s, it’s just easy to grab.” (Female; 40-49 years; Focus Group at T3).

“Yeah so tired on a Friday to think about looking nice for a meal or booking something. You’re just like no it’s just that easy... you don’t even have to get out of your car, just drive by you’ve got your meal in 10 minutes.” (Female; 40-49 years; Focus Group at T3)

At T2, participants with the greatest annual household income used Full Service retailers 2.4 (SE 0.73) times more than those with the lowest household income, an observation that approached significance at T3. These findings are corroborated by focus groups discussions where several participants noting that prices at Full Service retailers were higher than before the pandemic. Conversations around cost were more central during the second round of focus groups, and many participants indicated that it played a significant factor in deciding whether and where to eat OOH. Some participants reported that they would prefer to use Fast Food retailers to limit expense, or that using a Full Service retailer would be saved for special occasions only.

“Yeah, I think that the what’s more noticeable for us is how much more expensive things were than before COVID. So actually, the price plays more into our decision about whether we go out or have takeaway than the COVID restrictions and and sort of like living with COVID does it’s more about the price now... I can’t justify that on a very small household budget, so we will probably get more takeaways now as a treat.” (Female; 40-49 years; Focus Group at T3)

3.4. Methods of accessing OOH foods

Survey data showed that takeaway and delivery services were the predominant method used to access Fast Food across all three timepoints (**Figure 4a**). In focus group

discussions at T2, some participants reported they preferred to have food delivered as this was perceived safer in terms of Covid-19 infection risk, while others preferred to collect food from Fast Food retailers to 'get out of the house' and alleviate boredom during lockdown.

"I mean it's just a little bit like obviously, living in a house where I live with a friend, it's just nice to get out of the house and just be together for a little bit. I would say it is just getting out of the house with us being in the house most of the time." (Male; 20-29 years; Focus Group at T2)

When discussing delivery services, many focus group participants felt that use and presence of digital food delivery platform (DFDP) e.g. Uber Eats, Deliveroo, and delivery drivers had increased since the pandemic. While some enjoyed the increased variety and convenience these platforms afforded, others were concerned about how this would affect smaller, independent businesses, and remarked that they promoted overspending.

"I ordered a McDonalds breakfast the other day because I had no coffee and I wanted a coffee [laughs] honestly, I thought I will get a McDonalds breakfast because you can get them delivered now with Just Eat or whoever, Deliveroo. I got two breakfasts and it came to like £12.00 and I thought, 'What am I doing?' I only wanted a coffee.... And £12.00 so, I was thinking, how dangerous is it now though? Just to be able to just, I know you can always get takeaway food but there is so much more option now like McDonalds, I don't know if that was during lockdown or whatever, but it seems like every food outlet now will have Deliveroo or Just Eat or whatever... people are going to want to go to the big boys rather than the little fellas mostly and it's going to just take money out of their pocket but yeah, I think it's quite dangerous the amount of availability that there is now." (Male; 40-49 years; Focus Group at T3)

Some participants were enticed to use a DFOP for the first time during the study period by introductory promotional offers.

"I used to use Deliveroo sometimes. Uhm, I used it a couple of times because I think we got a leaflet through the door where you got 50% off or something. Umm which was really good. And Uber eats as well." (Female; 50-59 years; Focus Group at T3)

Survey data showed that 54% of participants used new 'enhanced' takeaway/delivery services at least once to access Full Service retailers since changes to planning regulations were made in March 2020. Yet, use of these services was relatively low across all three timepoints (6-10%) (**Figure 4b**). Reasons for this were discussed in focus groups; mainly, many participants stated they just wanted a 'traditional' takeaway when having food to eat at home. Several participants also remarked that the quality of delivered food was generally perceived as poorer than that consumed when dining-in (e.g., soggy, cold), and in some cases, this deterred participants from using delivery services again. While participants spoke of positive aspects of the introduction of takeaway/delivery services for Full Service retailers e.g. discovering new retailers and supporting businesses, there was consensus that these services were no longer needed when dine-in operations resumed (this was except for a slightly opposing view from the participant that was shielding who still valued being able to have food from Full Service retailers delivered home). Participants wanted to eat on-premises and recapture the social aspect of eating out that was greatly missed during lockdowns. Full service retailers were inextricably linked to socialising with friends and family, usually to mark special occasions e.g., birthdays, anniversaries, end of exams.

"I think it's about family and friendships and eating out is usually around an occasion to be fair... We like to get dressed up and just make a real night of it... it's about, for us it's about massively the social side of it." (Female; 20-29 years; Focus Group at T2)

"...eating out was always about being with other people, like not just going out to get some food. It's more about the experience of being around the people you like spending time with..." (Male; 20-29 years; Focus Group at T2)

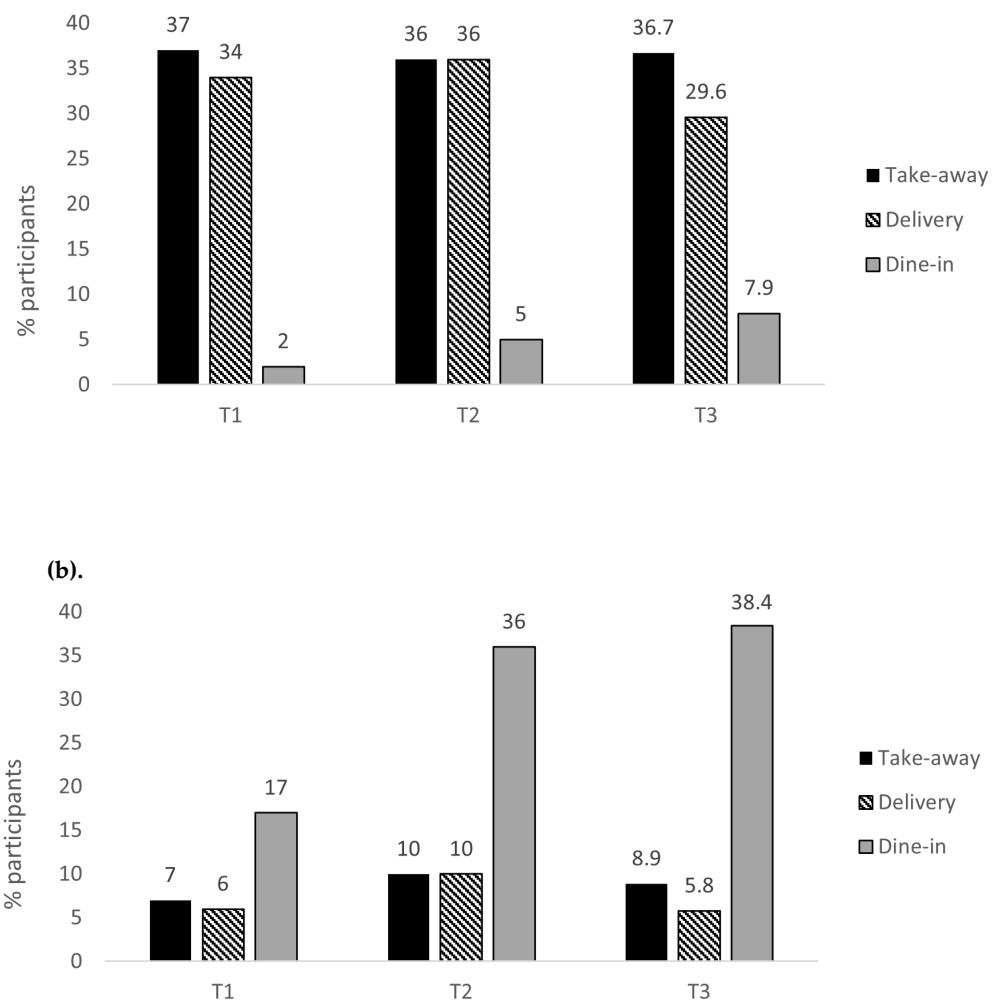


Figure 4. Methods of accessing food across time points from (a) Fast Food retailers, and (b) Full Service retailers. Timepoint 1 (T1) from 3rd – 5th May 2021: dine-in services in outdoor spaces only, public health measures enforced on-premises; Timepoint 2 (T2) from 20th May – 17th July 2021: indoor spaces reopened, public health measures enforced on-premises; Timepoint 3 (T3) from 11th February – 29th March 2022: all legal limits on OOH retailers abandoned. Takeaway/delivery services were available both for Fast Food and Full Service retailers at all time points.

When reflecting on lockdowns and not being able to dine-in at Full-Service retailers, participants primarily spoke about missing the social aspect of eating out and getting dressed up, rather than the food. During the second round of focus groups (T3), being able to go to Full Service retailers without restriction allowed participants to reconnect with family/friends from whom they felt distanced during lockdown. These focus group findings corroborate survey data showing that dine-in was the most common method of access at Full Service retailers (Figure 4b) and that use of dine-in increased markedly from 17% at T1 to 36% at T2 as restrictions eased, and was sustained at T3 (38.4%). In contrast, Fast Food retailers were not discussed in the context of socialising and were primarily used as a means to conveniently and quickly obtain food, and reduce ‘foodwork’ i.e. food preparation and washing up.

“When you go into a retailer, you’re fulfilling a social need. When you have a takeaway, you’re having food.” (Male; 20-29 years; Focus Group at T2)

3.5. Experiences of dining-in at Full Service retailers

Analysis of focus group data yielded two sub-themes related to the experience of dining-in at Full Service retailers: perceptions of Covid-19 risk, and enjoyability and atmosphere. Regarding the first theme, most participants reported that they felt some concern about Covid-19 risk while dining-in at Full Service retailers during the first round of focus groups. This concern was two-fold and related to participants' own vulnerability to contracting Covid-19, but also the risk of infecting others, especially older and more vulnerable people. Perception of Covid-19 risk was contingent on macro-level factors such as high case numbers, pervasive coverage in the media, population vaccination rates, and more proximal factors pertaining to individual venues such as crowdedness, patrons not observing social distancing, and unsatisfactory hygiene practices.

"Yeah, even sitting outside, I'm just not comfortable because you don't know people's hygiene. You just don't know what the cleaning regime is. You don't know if that person sitting next to you has got Covid-19 and yeah, had one vaccine, but you don't know. You mightn't have antibodies. You don't know." (Female; 50-59 years; Focus Group at T2)

While some measures such as distanced seating and outdoor seating allayed anxiety for some participants, others remained concerned and preferred to wait until they perceived the Covid-19 infection risk to be lower before dining on-premises.

At the time of the second focus groups (T3), virtually all participants were unconcerned about Covid-19 risk when dining on-premises and this was attributed to greater population vaccination rates, having personally contracted Covid-19 previously and perceived conferred immunity, perceived mildness of the Omicron variant (the dominant variant at the time), and lower media coverage of Covid-19, despite that Covid-19 infection rates were still considered high by participants. Participants considered their experience of dining-in to be 'back to normal'.

"I am very much the same as [name] so, I have had all three jabs, I have also had Covid twice so, I now feel like I am pretty much Superman [laughs] so, it's fine. Like, I have had it twice, it has not really bothered me either time so, I don't feel trepidation about it at all." (Male, 40-49 years; Focus Group at T3)

Regarding the second theme, several measures and adaptations were implemented on-premises to facilitate adherence with public health guidance, and these had varied impact on participants' enjoyment of the dining-in experience. Some innovations were viewed favorably by some participants, for example, implementation of table service, and creative use of outdoor space e.g. haybales as outdoor seating, although, enjoyment of eating at outdoor seating was weather dependent. However, some participants found that public health measures such as wearing of masks and distancing of seating, detracted from the enjoyment of dining-in, leading some to wait until measures were removed before dining-in again.

"The atmosphere, you're in a social environment and that's one thing I've disliked more so about going to retailers under the restrictions because it doesn't have the jovial, social atmosphere which is present typically in a retailer or a bar, everyone's got their masks on, not really looking at each other, not talking. You go out and meet new people, as well as spend time with your friends and that hasn't been there more recently." (Male, 50-59 years; Focus Group at T2)

At the second round of focus groups, almost all participants reported that enjoyability of the dine-in experience was 'back to normal'. Participants also liked having the choice of whether to sit in or outdoors.

"[Facilitator]...how do you feel about eating out at the moment?"

[Participant] Absolutely fine...Yeah, I I don't. I I don't even feel like there's any restrictions. I mean, you go into some places, there doesn't seem to be anything sort of in place anymore, which I quite like to be honest with you." (Female; 60-69 years; Focus Group at T3)

4. Discussion

This study investigated the use of Fast Food and Full Service retailers during various Covid-19 restrictions and changes to takeaway/delivery regulations pertaining to OOH food retailers in England. We collected data across three time points for people living in

the North West and North East of England. Our initial sample was 701 people, 615 responded to the follow-up questionnaire at T2 (87.7% of the original sample) and 490 (69.9% of the original sample) responded at T3. In later waves, less women and young people responded which may impact on how to interpret the results in relation to these two characteristics. Most participants (54%) reported using new takeaway/delivery services to access food from Full Service retailers at least once since their introduction. This was significantly greater than the 19% published in a report by accounting firm, KPMG [33]. Without access to KPMG's full survey methods, it is difficult to determine the reasons for this discrepancy, however, their results relate to access to food from retailers and pubs only, whereas ours encompassed all A3/A4 retailers which also included cafes and bars. Despite this, use of takeaway/delivery services for Full Service retailers at all three survey timepoints was relatively low. That only a small proportion of around 25% of survey participants who ate from Full Service retailers used takeaway/delivery services at T1, and that greater use of Full Service retailers at T2 and T3 was accompanied with greater use of dine-in, not takeaway/delivery services, suggests that the introduction of takeaway/delivery services would be unlikely to have a significant impact on population-level obesity. Reasons for low uptake of 'enhanced' takeaway/delivery services to access Full Service retailers emerged in focus groups. In agreement with a previous study [34], many participants preferred 'traditional takeaways' rather than 'restaurant food' when having food to be consumed off-premises, and some reported poor quality of delivered food deterred them from using the service again. While participants were supportive of the new takeaway/delivery services as a temporary 'bandage solution' to support Full Service retailers while dine-in operations were restricted, when Covid-19 risk was perceived to be low, participants were eager to dine-in and recapture the social aspect of the eating out experience, despite takeaway/delivery services still being available. One notable exception to this was the view of a focus group member who was shielding who still valued being able to have food from Full Service retailers delivered to their home.

Intake of Fast Food was consistently more frequent than food from Full Service retailers, with around 60% of survey participants consuming Fast Food at least once a week. This is more frequent than previous estimates of 21-40% of UK adults based on data collected in 2008-12 [35-36]. Our findings support claims that use of Fast Food has been spurred on during the pandemic [37]. It is plausible that this rise in Fast Food has been facilitated by delivery services; greater use and presence of DFDP delivery drivers was noted by several participants in focus groups, and around one-third of all participants used delivery services to access Fast Food at all three timepoints. This is consistent with reports finding that in the second quarter of 2021, DFDP, Deliveroo, reported a 110% increase in orders across UK and Ireland compared with the first half of 2020 [38]. Some focus group participants reported using these services for the first time during the study period, with some being enticed by introductory promotions - an observation in the previous KPMG study [33] and a known strategy used by businesses to grow their customer base [37]. Market intelligence analysts have predicted that the rise in delivery services will be a legacy of the pandemic [37]. Our survey data provides some preliminary evidence of this, showing that frequency of intake and use of delivery services to access Fast Food was sustained through to February 2022, although we cannot determine the proportion of deliveries made by third-party DFDPs or in-house services. The observed rise and projected trajectory of the use of delivery services to access Fast Food has occurred despite that around half of the local government areas in England implement planning policies that specifically aim to restrict the proliferation of Fast Food outlets to address obesity [39] e.g. exclusion zones around places for children and families, limiting the maximum number of consecutive takeaway food outlets [39]. The effectiveness of such policies may be undermined by delivery services that facilitate greater access to OOH retailers regardless of physical proximity/access. How delivery services fit within the planning system and the policy challenges they pose requires further research.

Several sociodemographic characteristics were consistently associated with greater use of retailers across all three timepoints. In line with national survey data [35, 40], younger people aged 18-24 years used both Fast Food and Full Service retailers more frequently than older participants. Eating OOH, especially Fast Food, is linked to social identity and is influenced by subjective social norms among adolescents and young adults [41]. Further, having obesity was consistently associated with greater intake of food from Fast Food retailers, but not foods from Full Service retailers. While evidence on the relationship between consumption of OOH foods and weight is equivocal, it does tend to show that BMI is associated positively with intake of Fast Food, but the association with other retailer types is either weaker [42] or non-significant [43]. It is unlikely that these differences are due to differences in energy content of menu offerings, which is similar across retailers, if not higher for Full Service retailer menu items [44]. An association with Fast Food but not Full Service retailers may be explained by unobserved sociodemographic factors that were not accounted for in our model. For instance, a cross-sectional study in Australian adults found that socioeconomic characteristics were associated with healthy and less healthy takeaway menu choices [45]. While we did not observe a significant difference in intake frequency between men and women, several female focus group participants mentioned that domestic and childcare responsibilities prevented them from dedicating time to foodwork and this prompted them to use Fast Food. That these insights were offered by female participants speaks to the persistent, gendered division of labour including food work [46].

We observed that use of Full Service retailers at T2 and T3 was greater in those with higher household incomes and cost was perceived as a more significant determinant of restaurant use and choice compared to before the pandemic. At the time focus groups were conducted, inflation rates in the UK were rising rapidly [47], and our findings demonstrate the tangible impact this had on people's decisions around OOH food use. Fast Food was consistently used more by those experiencing issues with accessing food for financial reasons. Research suggests that those who are food insecure may consume Fast Foods more often as they are more likely to live in high-poverty neighbourhoods with unfettered access to cheap, energy dense foods such that sold by Fast Food retailers [48], but constrained access to healthy and nutritious food. There are also suggestions that people experiencing food insecurity may use energy dense foods, such as Fast Foods, as a maladaptive strategy to cope with distress [49].

4.1. Strengths and limitations

This novel study provides insight into consumers' use of different types of retailers in Northern England during a specific time where OOH food sector was impacted by various Covid-19 restrictions and changes to takeaway/delivery regulations were implemented. Adopting a mixed-methods approach allowed us to correlate and contextualise survey findings with qualitative focus group findings. A longitudinal study design allowed us to determine changes over time as Covid-19 restrictions fluctuated. In terms of limitations, our study sample was recruited via Prolific which may have introduced some biases e.g. selection bias – participants who chose to take part in the study may systematically share characteristics and interests. There is also the risk that some participants complete the survey very quickly as a means to make more money on Prolific. However, we used several attention checks in all surveys to reduce the risk of using data provided by these participants. Also, although we took measures (stratified sampling) to recruit a diverse sample, our sample is not representative of the population in England. The findings would not be generalisable outside of the study population. However, they are still important to understand OOH food consumption and access and how it changes with external policy. Also, as we were interested in the impact of the new takeaway/delivery services for Full Service retailers, we dichotomised retailers into Fast Food and Full Service retailers and this limits more granular analysis of other retailer types.

4.2. Policy and practice considerations, and future research

Based on the findings of the current study, we make the following recommendations for policymakers, practitioners, and researchers in the field of obesity:

1. Delivery services are a growing part of the food environment and are commonly used to access Fast Food; this needs to be considered when developing local and national planning policies for obesity prevention;
2. Research is needed to understand how delivery services influence the impact of planning policies that restrict proliferation of Fast Food outlets;
3. Regarding future crisis-planning, if dine-in operations for Full Service retailers were restricted in future, reinstating takeaway/delivery services could be considered. They would help preserve business, and allow those considered vulnerable to enjoy these retailers.

In the context of existing literature, our findings also suggest that policies concerning Fast Food retailers should be prioritised over those concerning Full Service retailers owing to more frequent consumption and their association with obesity and issues with food access (especially in light of the current ‘cost of living’ crisis in the UK [50]). Also, as delivery services are currently unregulated and facilitate greater access to outlets regardless of physical proximity/access, upstream interventions that aim to improve the healthfulness of menu items must be explored. The feasibility and acceptability of these interventions from business and consumer perspectives need to be evaluated.

5. Conclusions

In the context of fluctuating Covid-19 restrictions and changes to takeaway/delivery regulations, in our sample Fast Food was eaten more frequently than food from Full Service retailers, especially among people with obesity and those with food access issues, and was commonly accessed via delivery services. The use of takeaway/delivery services to access food from Full Service retailers was low in our sample. As dining-on premises at Full-Service retailers is a highly valued part of social life, these services were no longer considered necessary once dine-in restrictions were removed and the risk of Covid-19 was perceived to be low. Policy-makers and practitioners need to acknowledge delivery services as a growing part of the food environment, and consider this when developing planning policies to address obesity.

Supplementary Materials: The following supporting information can be downloaded at: www.mdpi.com/xxx/s1, File S1: Baseline survey; File 2: Focus group topic guide

Author Contributions: MF conceived the study, collected the data, analysed the data, and drafted the manuscript; SS collected the data, analysed the data, and reviewed the manuscript; VA analysed the data and reviewed the manuscript; HB analysed data and reviewed the manuscript.. All authors have read and agreed to the published version of the manuscript.

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