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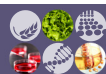
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Original article

Exploring the perception of small and medium food enterprises in Lincolnshire, UK on the use of front-of-pack nutrition labels by consumers

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Summary The food and drink industry is the UK's largest manufacturing sector, and small to medium-sized enterprises (SMEs) play a key role in the UK's food system. This study investigates food-providing SMEs' knowledge of nutrition labels and perceptions of the use of front-of-pack nutrition labels in making informed and healthy food choices by consumers. The SMEs were based in Lincolnshire, UK, and comprised food manufacturers (75%), food retailers (14%) and food service providers (11%) ($n = 35$). A 25-item questionnaire was developed and validated to collect responses. The questionnaire link was disseminated by email and completed online. Comparisons were made between competing answers using Cochran's Q tests, each with *post-hoc* pairwise McNemar test comparisons. Confidence intervals were computed using ordinal regressions. More than half of the SMEs' products (58%) had UK traffic light (TL) colour-coded schemes and % Guideline Daily Amounts (GDAs). The SMEs stated that the TL label was the best format that provided 'at-a-glance' information, and this was significantly higher than % GDA and interpretative text ($P_s < 0.003$). Nearly 49% of the SMEs were unaware of the front-of-pack labels being not mandatory in the United Kingdom. Many (86%) acknowledged that the nutrition information on food products was helpful or very helpful for consumers in making purchasing decisions. The SMEs seemed to place the costs of implementing FOP labels on food products above their helpfulness in making healthier food decisions by consumers. This research is one of the first to investigate the perceptions of SMEs on how consumers utilise nutrition labels when making healthier food choices in the United Kingdom. Government subsidies on the costs incurred by incorporating TL labelling on the products are necessary in order to have front of pack (FOP) labels mandatory in the United Kingdom. Greater food industry involvement in academic and policy-related research is essential to creating a healthier and more sustainable food environment.

Keywords Food providers, front-of-pack nutrition labels, knowledge, nutrition labels, small and medium enterprises.

Introduction

There is well-established evidence that consuming unhealthy foods is linked to rising diet-related illnesses (Hodgkins, 2016; Scott *et al.*, 2018; Pettigrew *et al.*, 2021; Miller *et al.*, 2022). Consumers have started to take the relationship between their health and diets seriously, and the focus is now more on avoiding unhealthy diets. However, food businesses' main drive is to manufacture more appealing and convenient foods (Severo *et al.*, 2018; Silva *et al.*, 2018). Nutrition labelling has been found to be an effective tool to

improve public health since it mediates healthier food choices by consumers and the drive for higher volume and lower prices by manufacturers (Cecchini & Warin, 2016; Buttriss, 2018; Ni Mhurchu *et al.*, 2018).

Nutrition label formats fall into two general groups: the back of package (BOP) and front of package (FOP) labels. In BOP labels, the number of calories, sugar, salt, fat and protein contents a product contains are disclosed (Ogundijo *et al.*, 2021a). FOP labels are majorly graphical representations of these nutrients in the form of colour, shapes, and other illustrations. UK consumers utilise the information on the FOP and BOP nutrition labels during food shopping to monitor

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what they will purchase (Kelly & Jewell, 2019; Department of Health and Social Care (DHSC), 2020; Bhawra *et al.*, 2022). This is the same in the United States, Australia and elsewhere (Dickie *et al.*, 2018; Jones *et al.*, 2019; Jáuregui *et al.*, 2022).

The food industry, public health professionals and government have a collective responsibility to help consumers eat healthily and sustainably (Acton *et al.*, 2018; Trafford & de la Hunty, 2021; Tas & Nehir El, 2024). Consumers are confronted continuously with many unhealthy foods provided by the food system, with a limited understanding of the available healthier alternatives (Barrett *et al.*, 2020). There are efforts from the UK government to reduce the burden of diet-related non-communicable diseases (NCDs) and promote healthy diets. Nevertheless, the role of food manufacturers in encouraging and contributing to healthy eating should not be overlooked (Román *et al.*, 2017; Department for Environment Food and Rural Affairs, 2022; Tas & Nehir El, 2024).

Small and medium enterprises (SMEs) are companies with less than 250 employees; they are sometimes called entrepreneurs (Niemi *et al.*, 2022). The food industry in the United Kingdom is made up of about 4525 food and drink manufacturers and 23 015 retailers regarded as SMEs (including sales via stalls and markets of food, beverages and tobacco products); of these, 78% are in England, and 12% of these are in Lincolnshire (the greatest share of SMEs per region) (Office for National Statistics, 2021). There are several studies on the use of nutrition labelling by food manufacturers. For example, the use of packaging to communicate nutritional information to consumers and an improved, healthier food choice communicated to consumers by store-brand labelled products (Fichera & von Hinke, 2020; Boccia *et al.*, 2024). However, to our knowledge, no study has investigated the perceptions of SMEs on how consumers utilise nutrition labels on their food packages to make healthier food choices in the United Kingdom. The food industry needs to communicate more with other stakeholders to contribute to policies and public health efforts on to what extent nutrition labels improve overall diets and health of consumers (Genannt Bonsmann *et al.*, 2020; Marion *et al.*, 2023). SMEs were chosen as the participants in this study because many of the multinational large-scale companies have already responded publicly to the challenges of nutrition labelling and other public health-related issues (Alvarillo, 2020; Marion *et al.*, 2023). The study sought to know the thoughts of the SMEs on nutrition labelling, which are underrepresented in the public health arena. We hypothesised that food manufacturers are aware that nutrition labels can help consumers make informed and healthy food choices. Therefore, this study evaluated the perceptions of small to medium-sized food manufacturers

on the use of nutrition labels by consumers in making informed and healthier food choices. Inferences were also drawn on the food manufacturers and retailers' concerns if FOP nutrition labels were to be mandatory on all food products in the UK retail market.

Methodology

Participants

Due to difficulty contacting the food businesses directly, the link to the survey was sent to 110 SMEs in Lincolnshire, UK, by email through gatekeeping and snowballing. Lincolnshire has an international reputation for food, fish, and farming and has one of Europe's largest concentrations of food manufacturing, research, storage and distribution areas (Greater Lincolnshire Local Enterprise Partnership, 2023). The ideal sample size at a 95% confidence interval and 10% margin error was determined to be 92, but 38 responses were received between March and August 2022 (41% response rate). Of the responses received, only 35 (92%) were useable; the remainder were incomplete or from large-scale enterprises (i.e., with more than 250 employees). For convenience, the SMEs (i.e., food manufacturers, retailers, and food service providers) were collectively referred to as 'food providers' within the text. This term includes businesses that produce, retail or sell labelled packaged foods and drinks, including sales via stalls, cafes and markets.

Questionnaire development, validation and justification for inclusion

The study employed a web-based questionnaire. As recommended by Siva *et al.* (2019) and Holtom *et al.* (2022), instead of conducting interviews and focus groups, a web-based questionnaire is convenient and ideal where anonymity, confidentiality and privacy are critically considered due to the limited availability of the participants (individuals representing the food businesses in our instance) who did not want to provide extra information about their businesses. The 25-item questionnaire (Appendix 1) comprised three sections to: (i) explore the information and the types of nutrition labels used on their products (Section A); (ii) gather the knowledge of food providers on nutrition labelling as a healthier tool for consumers' food choice (Section B); and (iii) collect information about the company (Section C). The researchers and highly experienced food industry experts ($n = 8$) reviewed the developed questions (face validity). The experts validated the contents of the questionnaire and provided helpful feedback. The questions' readability, comprehension and construct were assessed based on the

perceptions of the validation panel. The procedure described by Ogundijo *et al.* (2021b) was followed for this.

Piloting the questionnaire

Without any preference for any food industry sector, the seafood industry was randomly selected to pilot the survey. A gatekeeper sent the questionnaire link to 11 seafood companies in Lincolnshire, UK. The response rate was low; only one response was received after 6 weeks of piloting, despite several reminder emails sent at 2-week intervals.

Data analysis

An ordinal regression data plot was carried out on the responses, and the error bars were added to the graphs at 95% confidence intervals for the cumulative percentages. Confidence intervals for each boundary in the stacked bar chart were extracted from a single ordinal regression (with no predictors) for each variable to understand the opinions of a broader population of food providers. It was of interest not only how the responses were distributed but also how the responses within each given question were compared. To understand their distributions, they were visualised as bar charts showing the proportion of participants who ticked each item.

To compare the frequency of responses to the different options within each question, a Cochran's Q test was run across the responses for that one 'select-all-that-apply' question, followed by *post hoc* pairwise McNemar tests (using the 'rcompanion' package in R). *Post hoc* comparisons were adjusted using a 'false discovery rate' approach that should allow only 5% of significant results to be false positives.

Results

Company information

Most participants were food manufacturers (75%), followed by food retailers (14%) and food service providers (11%) (Table 1). Directors and managers comprised 40%. Many SMEs had between 50 and 249 employees (74%). Even though the companies' revenue was stated to be only used for statistical categorisation, 60% of the participants did not disclose this information. More than 25% of the participants manufactured or retailed breakfast cereals (such as porridge, muesli, granola and cornflakes) and ready meals (e.g., sandwiches, pasta and soups). About 18% manufactured or retailed seafood (such as fish and shellfish), meats, crisps and snacks, bread, biscuits, and/or bakery products. The remainder produced food

Table 1 Company/participant information ($n = 35$)

Variable	Characteristics	Frequency (n)	Per cent (%)
Category of SMEs	Food manufacturer	26	75
	Food retailer	5	14
	Food service provider	4	11
Job role of participant	Director	6	17
	Manager	8	23
	Technical professional	9	26
	Industry professional	2	6
	Sales professional	4	11
Department	Administrator	0	0
	Other	6	17
	New product development	4	11
	Production/operations	15	43
	Sales/finance	3	9
	Technical/quality	10	29
	Other	3	9
Number of employees	Engineering	0	0
	Marketing	0	0
	0–9	5	13
	10–49	2	5
	50–249	28	74
Annual revenue (£)	250–499	0	0
	500+	0	0
	I don't know	0	0
	<100 000	3	9
	100 000–499 999	2	6
	500 000–999 999	2	6
	1 Million–99.99 Million	5	14
500 Million and above	100 Million–499.99 Million	2	6
	500 Million and above	0	0
	Prefer not to say	12	34
	Don't know	9	26

flavours, sauces, purees, dressings and marinades (data not shown).

Front of pack labels used by small to medium-sized enterprises

According to what was stated by the participants, only 95% of the foods from the SMEs had mandatory back-of-pack nutrition labels (BOPNLs) (Fig. 1). More than half of the products (58%) had TL colour-coded schemes and %GDAs. At least 46% of the products had only the TL scheme, and 23% had TL combined with GDA/Reference Intakes (RIs). Nutri-score, interpretive text and Healthier Choice Tick were significantly less commonly used (23%, 20% and 12%, respectively; $P_s < 0.003$). A few food providers might have misunderstood the question about the labelling formats because the terms 'sauce' and 'puree' were incorrectly provided as a response.

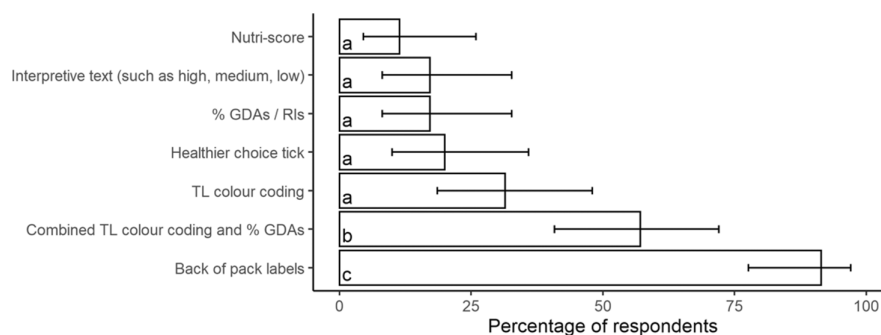


Figure 1 The labelling formats used by SMEs (Question A2, Appendix 1). The comparisons between questions are captured in the letters displayed on each bar. Any two bars that do not share a letter differed significantly, according to the pairwise comparisons. The letters a, b and c represent the significance level among the options. Where two bars do not share a letter, either 'a' or 'b' or 'c' written against them, they are significantly different at 95% CIs.

Knowledge of front of pack labels and perceptions on consumer use

The SMEs' responses to how nutrition label formats could provide 'at-a-glance' nutrition information for consumers varied (Fig. 2). The UK TL label was said to be the format that best provided 'at-a-glance' information about food products, which was significantly higher than %GDA and interpretative text ($P_s < 0.003$). While TL colour coding was found to be more helpful in making purchasing decisions, its lead over BOP, healthier choice tick and Nutri-score labels was not statistically significant ($P_s > 0.064$). Significant differences were not seen among %GDAs, interpretive text, and the combination of TL and %GDAs ($P_s < 0.109$). %GDA format was believed to provide the least 'at-a-glance' information, and it was rated significantly lower than Nutri-score ($P < 0.022$), Healthier Choice Tick ($P = 0.013$), and TL ($P = 0.001$).

The SMEs' understanding of FOP and BOP labelling is presented in Fig. 3. A higher number of SMEs (31%) claimed that the mandatory BOP format showed the healthiness of food products compared with 19% for the FOP. Six of them (17%) claimed that BOP was ineffective in showing food products' nutritional quality, and 21% claimed that BOP was as effective as FOP labels. Several SMEs (12%) were unsure regarding nutrition labels' effectiveness in demonstrating the nutritional quality of foods. Surprisingly, only 9% of the food providers claimed that nutrition information does not need to be declared on the front of all pre-packed foods in the United Kingdom, with 49% not knowing whether this was mandatory (Question B4, Table 2).

Table 2 shows the responses to the questions (B5 to B9) that gauged the SMEs' perceptions towards consumers' use of nutrition labels (NLs). The ordinal variables of the responses are presented in Table 3. About half (51%) of the participants affirmed that the

nutritional information on food products is easy or very easy for consumers to understand (Question B5). Many food providers (86%) acknowledged that the nutrition information on food products was 'helpful' or 'very helpful' for consumers in making purchasing decisions (Question B6). About 89% agreed that the TL colour-coded labelling format would be effective in assisting consumers in making informed, healthier choices if it was mandated to be included on all food products (Question B8). In fact, all participants (100%) agreed that the use of TL colour coded labels (which are recommended by the UK government) would be effective or very effective in assisting consumers to make informed, healthier choices if they were mandated on all food products. However, 40% claimed that consumers would not purchase the same products if their company's labelling formats changed, and the majority (60%) stated that SMEs would incur high costs if all products adopted any one of the FOP formats, including the UK TL format (Questions B7 and B9).

Discussion

Even though 14% of the food providers in this study appeared to be unaware of the importance of nutrition labelling to consumers, their knowledge of nutrition labels as an effective and valuable tool is consistent with existing consumer studies (Wartella *et al.*, 2011; Food Standard Agency, 2016; Acton *et al.*, 2018). This could be because some participants made food purchasing decisions (as consumers) within their households. Most SMEs acknowledged the importance of BOP nutrition labelling, which has been compulsory on all pre-packed foods in the European Union since December 2016 (European Union (EU) Regulation No. 1169/2011).

Most foods (95%) produced by the food providers were reported to have mandatory BOPNLs; this result

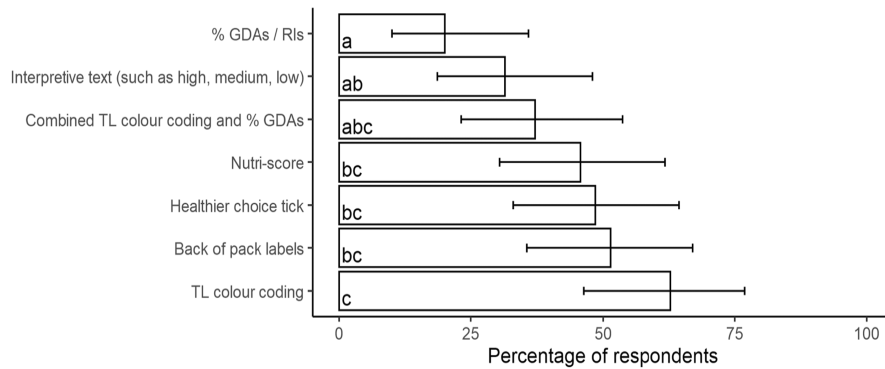


Figure 2 The labelling formats that provide ‘at-a-glance’ nutrition information for consumers to make informed choices (Question B1, Appendix 1). The comparisons between the questions are captured in the letters displayed on each bar. Any two bars that do not share a letter differed significantly, according to the pairwise comparisons. The letters a, b and c represent the significance level among the options. Where two bars do not share a letter, either ‘a’ or ‘b’ or ‘c’ written against them, they are significantly different at 95% CIs.

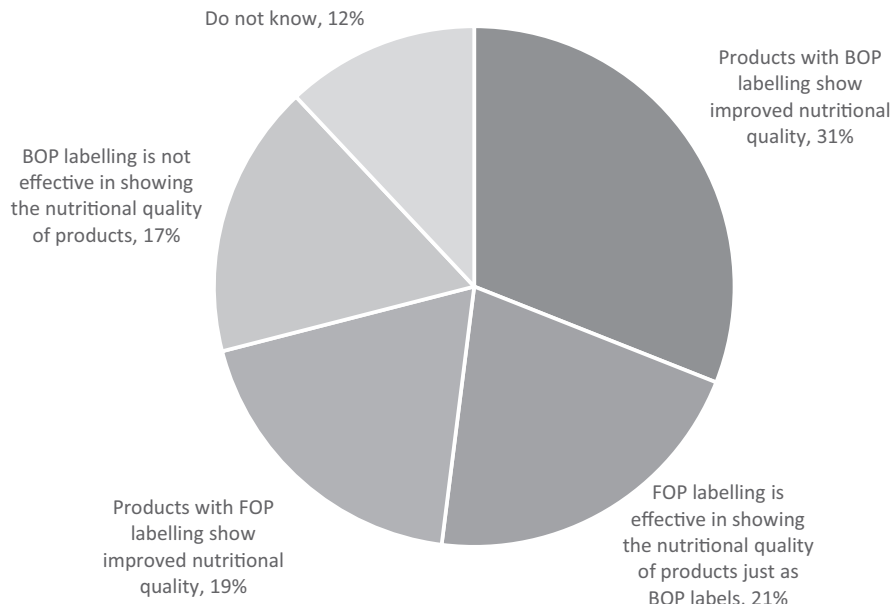


Figure 3 Food providers’ understanding of FOP and BOP labelling (Question B3, Appendix 1).

is consistent with our previous finding that 97.1% of the food products analysed in the UK retail market ($n = 500$) had BOP nutrition information (Ogundijo *et al.*, 2021a). The fact that most products had BOPNLs showed the level of compliance of the food industry with the aforementioned regulation. Some foods (such as tea and coffee) are exempt from having BOPNLs due to their insignificant or negligible nutrient content. This possibly contributed to the remaining 5% that did not carry BOPNLs in this study.

FOPNLs can drive product reformulation in the food industry to manufacture products with low fat,

saturated fat, salt and sugar content, thereby helping to improve the overall healthiness of our diets (Brownell & Koplan, 2011; Croker *et al.*, 2020; European Heart Network (EHN), 2020; Song *et al.*, 2021). The benefits of FOP labels, especially the TL labels, in making healthier food choices have been reported across the world (Australia, Canada, UK, USA, etc.) (Emrich *et al.*, 2017; Moore *et al.*, 2018; Kelly & Jewell, 2019). However, it is surprising that the UK government did not mandate FOPNLs when the United Kingdom was a member of the European Union (EU). The reason for this was speculated to be the claim that the UK’s FOP TLs did

Table 2 Food providers' knowledge of nutrition labels

Questions	Responses (% , n)				
B4. Do you think that it is necessary for nutrition information to be declared on the front of all pre-packed foods in the United Kingdom?	Yes 42.86% (n = 15)	No 8.57% (n = 3)	Don't Know 48.57% (n = 17)		
B5. In your opinion, how do you feel that consumers find the nutritional information on food products?	Very easy 11.43% (n = 4)	Easy 40.00% (n = 14)	Difficult 40.00% (n = 14)	Very difficult 0% (n = 0)	Don't know 8.57% (n = 3)
B6. How helpful do you feel that nutritional information on labelling assists consumers to make purchasing choices?	Very helpful 8.57% (n = 3)	Helpful 77.14% (n = 27)	Not at all helpful 5.71% (n = 2)	Don't know 8.57% (n = 3)	
B7. In your opinion, do you feel that consumers would still purchase the same products even if the labelling format had changed?	Very likely 8.57% (n = 3)	Likely 42.86% (n = 15)	Unlikely 37.14% (n = 13)	Very Unlikely 2.86% (n = 1)	Don't know 8.57% (n = 3)
B8. The use of traffic light colour-coded labels (labels with red, amber, and green) is recommended by the UK government, but it is still voluntary. In your opinion, how effective do you think it would be in helping consumers to make informed choices if this was made mandatory on all UK food products?	Very effective 14.29% (n = 5)	Effective 74.29% (n = 26)	Not at all effective 0% (n = 0)	Don't know 11.43% (n = 4)	
B9. In your opinion, would your company incur high costs if all products adopted any one of the 'Front-of-Pack' (FOP) formats, including the UK Traffic Light System (Green-Amber-Red)?	Yes 60% (n = 21)	No 20% (n = 7)	Don't Know 20% (n = 7)		

not meet the provisions of EU Regulation No. 1169/2011 Subsection 38 (Jebb *et al.*, 2013; Cuocolo, 2014). The Italian authorities stated that FOP TLs would discriminate against exported Italian food products to the United Kingdom and cause a reduction of up to 11.2% of their total export (Italian Delegation Report, 2014; Cole *et al.*, 2019). The expectation is for the UK government to consider the recommendations of the existing studies and mandate TL, Nutri-Score or warning labels after Brexit, but this has not been the case so far (DHSC, 2013; DHSC, 2020; Song *et al.*, 2021).

The concerns of food businesses regarding mandating FOPs should be addressed. These were included in the second consultation document by the Department of Health & Social Care (DHSC) and the Department of Health (DoH) (DHSC, 2020). The stance of the SMEs in this study appears to be that not all food products in the retail market must carry FOP labels (Table 2). The high cost of including FOP on all food products, a point raised by the SMEs in this study, is consistent with earlier studies (EHN, 2020). Moreover, the SMEs believed some of their food products that carry red lozenges may not be bought by consumers like other foods (Thow *et al.*, 2018; Werle *et al.*, 2022). Germany's food industry was also against TLs because most food businesses feared that consumers would be prejudiced against their products with red lozenges (Drescher *et al.*, 2014).

The costs associated with the inclusion of FOPs on packaging have already been reported as financial and time-frame costs (EHN, 2020). The enforcement costs, the costs to the business due to reformulation and the

familiarisation time with any changes (both for consumers and companies) should be considered. The UK government must act on the recommendations of the research community and the report of the second consultation of the Food Standard Agency (FSA) on making FOP mandatory on all packaged food products (DHSC, 2020). The UK government can subsidise the costs of implementing new label formats and reformulations by the food and drink industries in order to mandate FOP nutrition labels. The current study joins other existing studies (Emrich *et al.*, 2017; Song *et al.*, 2021), to clamour for making TL labelling mandatory on all food products in the United Kingdom, as the authors believe that its potential benefits for consumers outweigh its potential costs for food businesses.

Limitations and implications for practice

There were some limitations to the study. Firstly, the response rate from the SMEs was low despite the extended closing date for the completion of the questionnaire and several reminders to encourage SMEs to participate. Low response rates in other studies featuring food businesses have also been reported (Traill & Meulenberg, 2002; Lea *et al.*, 2005). Nonetheless, there have been debates on whether the level of response rate actually determines the quality of the sample and their responses (Holtom *et al.*, 2022).

Future studies should find ways to encourage greater involvement of the food industry in academic and policy-related research (Gibson-Moore & Spiro,

Table 3 Ordinal variables with error bars of 95% confidence intervals for the cumulative percentages

Questions	Response	N (%)	Cumulative Total?	95% CI
Does clear nutrition information influence decisions? (B2)	Very Likely	5 (15%)	5 (15%)	[6%, 30%]
	Likely	23 (68%)	28 (82%)	[66%, 92%]
	Unlikely	6 (18%)	34 (100%)	[90%, 100%]
	Very Unlikely	0 (0%)	34 (100%)	[90%, 100%]
Is FOP nutrition information necessary? (B4)	Yes	15 (83%)	15 (83%)	[61%, 94%]
	No	3 (17%)	18 (100%)	[82%, 100%]
What is your level of ease of interpreting nutritional information? (B5)	Very easy	4 (12%)	4 (12%)	[5%, 28%]
	Easy	14 (44%)	18 (56%)	[39%, 72%]
	Difficult	14 (44%)	32 (100%)	[89%, 100%]
	Very difficult	0 (0%)	32 (100%)	[89%, 100%]
Does nutritional labelling helpful to consumers? (B6)	Very helpful	3 (9%)	3 (9%)	[3%, 24%]
	Helpful	27 (84%)	30 (94%)	[80%, 98%]
	Not at all helpful	2 (6%)	32 (100%)	[89%, 100%]
Would consumers buy product even if Labelling changes? (B7)	Very likely	3 (9%)	3 (9%)	[3%, 24%]
	Likely	15 (47%)	18 (56%)	[39%, 72%]
	Unlikely	13 (41%)	31 (97%)	[84%, 99%]
	Very Unlikely	1 (3%)	32 (100%)	[89%, 100%]
How effective would making TL coding mandatory? (B8)	Very effective	5 (16%)	5 (16%)	[7%, 33%]
	Effective	26 (84%)	31 (100%)	[89%, 100%]
	Not at all effective	0 (0%)	31 (100%)	[89%, 100%]
Would your company incur a cost for adopting universal FOP labelling?	Yes	21 (75%)	21 (75%)	[57%, 87%]
	No	7 (25%)	28 (100%)	[88%, 100%]

2021). Secondly, there are limitations inherent to the use of questionnaires, such as participants not choosing answers that reflect their actual intentions and experiences (Kiesel *et al.*, 2011; Breakwell *et al.*, 2020).

We therefore acknowledge the impact of the low response rate on limiting the generalisability of the results for SMEs in the rest of the United Kingdom. However, we feel that this study is important in conveying the perception of SMEs who do not have much representation when compared to larger-scale multi-national food businesses. The study is also significant in creating awareness of the grand role of food businesses in shaping the food systems and creating the food environment where consumers source their food from. This study would be extended to other geographical areas in the United Kingdom and elsewhere to obtain a more complete picture of the perceptions of food manufacturers. With this study, it is hoped that food manufacturers would acknowledge that their products contribute significantly to public health. We also support the notion that the staff who work in the food industry should be trained to have more nutritional knowledge, since they are the gatekeepers to consumers food choices. The UK government and public health practitioners have taken actions to ensure the wider use of BOP and FOP by consumers, but further actions are needed to ensure that the FOPNLs are mandatory on all food products. The government should encourage food providers to use FOPNLs on their food products. It is also essential

that the government reinforce policies and regulations on producing healthy food products by either incentivising or tax-scare forcing food manufacturers.

Conclusions

This study evaluated the knowledge of small to medium-sized food manufacturers, retailers and food service providers on the use and roles of nutrition labels in making informed and healthier food choices by consumers. Although the food providers stated that nutrition labels influenced consumers to make healthier food choices, they seemed to place the costs of implementing the front-of-pack labels on food products above their helpfulness in making healthier food decisions. This study is consistent with some empirical studies that show that front-of-pack traffic light nutrition labels can provide 'at-a-glance' nutrition information, and their presence on all packed food products can promote healthier choices.

Educating employees in the food industry on nutrition and healthy eating is vital. This will enable them to acknowledge and better appreciate their critical role (as an individual and company) in creating the food environment from which consumers derive all their food choices. The government should subsidise additional costs by including traffic light labelling on packaging. Finally, greater involvement of the food industry in academic and policy-related research is anticipated, as this is essential to creating and

maintaining a healthier and more sustainable food environment.

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Author contributions

Daniel A. Ogundijo: Conceptualization; investigation; writing – original draft; methodology; validation; formal analysis; data curation; writing – review and editing. **Ayten A. Tas:** Conceptualization; methodology; validation; writing – review and editing; supervision; resources; investigation. **Bukola A. Onarinde:** Conceptualization; methodology; supervision; resources.

Conflict of interest

The authors declare no conflict of interest.

Ethics statement

Participation in this research was voluntary, anonymous and confidential, and the participants were asked to consent before completing the survey. The ethics reference number for the study was UoL/2151_2021.

Peer review

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/ijfs.17166>.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Appendix 1

Food providers' questionnaire, Doc DOQN4

Title of research: Measuring manufacturers' and retailers' perceptions of nutritional labelling and their response to the increased public interest in making informed food choices in the United Kingdom.

We would like to invite you to take part in our research study. Before you proceed, we would like you to understand why the research is being carried out.

What is the purpose of the study? This study explores the knowledge by food manufacturers and retailers on the use of nutrition labels and how they have responded or are responding to the increased public interest in making informed food choices.

Do I have to take part? No, it is up to you to decide whether to take part. If you do decide to take part, you will be asked to sign a consent form. You are free to withdraw at any time, without giving any reason, and without your legal rights being affected.

What will happen to me if I take part? You will be asked to fill out a self-reporting questionnaire regarding your experiences and perceptions of the nutrition labelling culture in your organisation. Your participation will take approximately 12–15 min. There are no right or wrong answers; we are simply interested in your honest opinions. Your participation is completely anonymous.

Will I receive any incentive after I take part? Participants will not be paid or offered any other incentive to participate in the study.

What are the possible disadvantages and risks of taking part? The project is considered low risk based on the topics and methods.

Will my taking part in the study be kept confidential? Your information will be kept completely confidential, and we shall follow all appropriate ethical and legal practices as required by the University of Lincoln.

Privacy notice: The University of Lincoln is the lead organisation for this study. The university's Research Participant Privacy notice <https://ethics.lincoln.ac.uk/researchprivacynotice/> explains how we will be using information from you in order to undertake this study and will be the data controller for this study. This means that we are responsible for looking after your information and using it properly.

What will happen to the results of the research study? The results of the research study will only be used for statistical analysis and academic purposes.

Who is organising and funding the research? This research is organised by the University of Lincoln and self-funded by the researcher.

Who has reviewed the study? All research conducted by the University of Lincoln is looked at by an independent group of people, called the Research Ethics committee to protect your interests. The ethics committee approval reference for this study is 2151.

What if there is a problem? If you have a concern about any aspect of this study, you should ask to speak to the researcher who will do his best to answer your questions. The researcher contact detail is provided at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this by contacting ethics@lincoln.ac.uk

If you feel that we have let you down in relation to your information protection rights, then please contact the Information Compliance team by email on compliance@lincoln.ac.uk or by post at Information Compliance, Secretariat, University of Lincoln.

You can also make complaints directly to the Information Commissioner's Office (ICO). The ICO is the independent authority upholding information rights for the United Kingdom. The website is ico.org.uk and their telephone helpline number is 0303 1 231 113.

Should you have any queries or concerns, please contact Daniel Ogundijo.

Email: dogundijo@lincoln.ac.uk

Declaration of consent

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my legal rights being affected.

Please accept to give consent

Is your company a small and medium-sized enterprise (SME)?

The usual definition of small and medium-sized enterprises (SMEs) is any business with fewer than 250 employees. House of Commons Library Small businesses and the UK economy Standard Note: SN/EP/6078 2014.

Yes

No

How would you describe your company? Please tick the most appropriate

Manufacturer

Retailer

Restaurant

Food service

Section A. Factual information on products and labels.

A1. Which of the following categories best describes the products that you process, produce or manufacture? Please select all that apply.

- Alcoholic drinks, for example beer, cider, spirits, vodka, gin, tequila, rum, whisky, brandy, etc. Beans and other pulses, for example lentils
- Bread, biscuits and/or bakery products
- Breakfast cereals, for example porridge, muesli, granola, and cornflakes
- Canned or jarred food products such as meat, fruits, and vegetables
- Crisps and snacks
- Dairy products, for example milk, yoghurt, cream, cheese, kefir, whey, fromage frais, and butter
- Eggs
- Food supplements and products that boost immunity
- Fruit juices
- Herbs and spices
- Meats
- Non-alcoholic drinks in Group A, for example coffee, tea, chocolate, cocoa products, etc.
- Non-alcoholic drinks in Group B, for example carbonated drinks or other soft drinks
- Nuts and seeds
- Ready meals, for example sandwiches, pastas, and soups
- Seafoods such as fish and shellfish
- Spreads such as jams, jellies, yeast extract and margarine
- Vegetable oils
- Water, for example sparkling water, mineral water
- Other

If 'Other,' please give the name of the product here _____

A2. Which of the nutrition labelling format(s) are used on your company's food products? Please select all that apply

- Back of pack labels
- Combined Traffic Light (TL) colour coding system and % Guideline Daily Amounts (GDAs)
- Healthier choice tick Interpretive text (such as high, medium, and low)
- Nutri-score
- Percentage Guideline Daily Amounts/Reference Intakes (RIs)
- TL colour coding system

- Other

If 'Other,' please give the name her _____

A3. What percentage of the products manufactured by your company carries the UK Government's Traffic Light Scheme labelling?

- 1%–100% _____

Section B. Knowledge of food producers on nutrition labels.

B1. In your opinion, which of the following provides consumers with 'at-a-glance' nutritional information to make informed choices? Please select all that apply

- Back of pack labels
- Combined TL and %GDA
- Healthier choice tick
- Interpretive text (such as high, medium or low)
- Nutri-score
- Percentage Guideline Daily Amounts (GDAs)/Reference Intakes (RIs)
- Traffic light (TL) colour coding system

B2. In your opinion, do you consider consumers more likely to make a positive purchase decision if nutrition informational is clearly marked on the front of pack?

- Very Likely
- Likely
- Unlikely
- Very Unlikely
- Don't know

B3. Which of the following statements best represents your understanding of nutritional labelling? Please select all that apply.

- Products with "Front-of-Pack (FOP)" labelling show improved nutritional quality
- Products with "Back-of-Pack (BOP)" labelling show improved nutritional quality
- BOP labelling is not effective in showing the nutritional quality of products
- FOP labelling is effective in showing the nutritional quality of products just as BOP
- Don't know

B4. Do you think that it is necessary for nutrition information to be declared on the front of all pre-packed foods in the United Kingdom?

- Yes
- No
- Don't know

Please briefly give a reason if your answer is Yes or No _____

B5. In your opinion, how do you feel that consumers find the nutritional information on food products?

- Very easy
- Easy
- Difficult
- Very difficult
- Don't know

B6. How helpful do you feel that nutritional information on labelling assists consumers in making purchasing choices?

- Very helpful
- Helpful
- Not at all helpful
- Don't know

B7. In your opinion, do you feel that consumers would still purchase the same products even if the labelling format had changed?

- Very likely
- Likely
- Unlikely
- Very Unlikely
- Don't know

B8. The use of traffic light colour coded labels (labels with red, amber and green) is recommended by the UK government, but it is still voluntary. In your opinion, how effective do you think it would be in helping consumers to make informed choices if this were made mandatory on all UK food products?

- Very effective
- Effective
- Not at all effective
- Don't know

B9. In your opinion, would your company incur significant costs if all products adopted any one of the "Front-of-Pack" (FOP) formats including the UK Traffic Light System (Green-Amber-Red)?

- Yes
- No
- Don't know

Section C. Demographic information.

We would like to know about you. This data will be kept anonymously and only be used for statistical analysis.

C1. Which of the following headings/categories do you belong to?

- Administrator
- Director
- Industry Professional
- Manager
- Sales Professional
- Technical Professional
- Other

If you describe your role as other, please provide it here _____

C2. Which of the following department do you work in?

- Engineering
- New Product Development
- Production/Operations
- Sales/Finance
- Marketing
- Technical/Quality
- Other

If you selected 'Other' above, please explain it here _____

C3. Approximately, how many people work in your organisation?

- 0–9
- 10–49
- 50–249
- 250–499
- 500+
- I don't know

C4. Approximately what is the annual revenue for your organisation? Expressed in GBP (£)

- <100 000
 - 100 000–499 999
 - 500 000–999 999
- 1 Million–99.99 Million
 - 100 Million–499.99 Million
 - 500 Million and above
 - Prefer not to say
 - Don't know