Public Health Nutrition: 24(4), 746–754 doi:10.1017/S1368980020002840

Does labelling of healthy foods on menus using symbols promote better choices at the point-of-purchase?

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Submitted 3 February 2020: Final revision received 8 June 2020: Accepted 15 July 2020: First published online 28 August 2020

Abstract

Objective: Take-away foods account for a significant proportion of dietary intake among young adults (18–35 years). Young adults want nutrition information at the point-of-purchase (POP); however, it is either unavailable, perceived as ineffective or difficult to use. The present study examined whether symbols on university food outlet menus identifying healthier options would increase their sales and consumer's awareness of these symbols, purchasing factors and barriers to eating healthy foods.

Design: Repeated-measures, comparison group, quasi-experimental study.

Setting: Two carefully matched university food outlets were analysed to determine the targeted items. Tick symbols ✓ were placed next to the targeted items in the experimental outlet. No changes were made at the comparison outlet. Customers were surveyed at the experimental outlet. Food sales were collected for 4 weeks from both outlets at baseline and during the intervention. Food sales were also collected from the experimental outlet 10 weeks later.

Participants: Food outlet patrons.

Results: Significant increases in food sales were observed during observation 3 compared with observation 1 ($P = 0{\cdot}0004$) and observation 2 ($P = 0{\cdot}0002$). Sixty-eight per cent of respondents noticed the symbols, and of that, 30 % reported being influenced. Taste was the most common purchasing factor, and people were less likely to select taste as a factor if they were influenced by the symbols ($P = 0{\cdot}04$).

Conclusions: Identifying healthier options with a symbol at the POP increased sales over time. Several purchasing factors (price, taste and healthy food availability) need to be addressed to improve the food selection of young adults.

Keywords
Menu labelling
Nutrition information
Healthy symbols
Point-of-purchase
Young adults
Universities

Over the last five decades, there have been profound changes in universal eating habits, with an increase in the food consumed outside the home[1,2]. This is of particular concern for young adults, with approximately 40 % of their daily calorie intake originating from food eaten out and fast food contributes to large portion of that[3]. There are growing concerns with a large amount of food eaten out, due to it generally containing more calories and having less nutritional value, compared with home-cooked meals[4,5], and its association with obesity[6–8].

The obesity epidemic is a significant issue for many countries worldwide, including New Zealand (NZ)[9]. Thirty-nine per cent of adults aged ≥18 years were overweight in 2016, and 13 % were obese worldwide[10]. Recent statistics revealed that approximately 32 % of the NZ adult population is now classified as obese[11]. The substantial number of comorbidities associated with obesity[12], and the detrimental effect it has on the health-care system, is a cause of great concern[13]. Therefore, understanding the drivers of obesity is vital to help create solutions to this epidemic[12]. Globally and in NZ, there has been an increased intake of energy-dense foods that are high in fat and sugars, especially when eating away from home[10,11].

Interventions focusing on improving the obesogenic environment are becoming increasingly popular, as they have the potential to prevent obesity and improve health by promoting positive behaviour changes among population groups[14]. One of the numerous food environment interventions that have been proposed is nutrition labelling on menus at the point-of-purchase (POP)[15]. At present, the availability of nutrition information at the POP is

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limited, and food labelling helps to combat this[16]. Food labelling aims to provide consumers with more information about food products, which, in turn, allows them to make healthier and more informed choices[17]. A variety of food labelling formats are currently available, with calorie labels being the most abundant, however not necessarily effective[18]. It has been suggested that the use of more interpretive and easy-to-understand labels may be more effective in improving people's food choices[18].

The use of symbols provides a simple alternative, which may be easier for all consumers to understand. Studies show that a symbol on menus is accepted by consumers as it is quick and straightforward to use and has the potential to be effective[19–21]. The heterogeneity of studies makes it difficult to compare findings. Differences in the settings of studies, such as a restaurant, cafeteria or fast-food outlet, may result in different findings[22]. Although early research regarding menu labelling with symbols showed a significant increase in healthy choices purchased[23–26], more recently, with a larger number of studies available, the research suggests that the use of symbols on menus is inconclusive[27]. Therefore, more research is required to determine the effectiveness in various outlets and among different age groups over a longer period.

Many factors may influence a person's food selection at POP. Some of these may include price, taste, preference, convenience, social pressures, health and nutrition[28–31]. For different individuals, these may be motivators or barriers to using nutrition information and eating healthy[29]. Understanding the different factors influencing a person's food choice may help explain reasons for individuals using and not using nutrition information provided at the POP[25,29,32].

We, therefore, aimed to investigate whether a POP nutrition intervention in the form of symbols targeting healthier foods increases sales of these symbolled menu items and whether the change in sales persists over time. We also aimed to investigate consumers' awareness of the healthy symbols, whether it influences their purchases and to determine other factors influencing consumers' purchases and barriers to healthy food purchase.

Methods

Study design and setting

A quasi-experimental study was conducted using a repeated-measures design with a comparison group. The present study was conducted in a real-life setting at two food outlets at a large urban university with over 40 000 students and over 4000 staff[33]. The university has different types of food outlets, and these include convenience stores, restaurants, cafes, and takeout and vending machines (*n* 57)[34]. Two carefully matched takeout food outlets (sold similar number of products per week, similar prices between $6·50 and $11 and similar customer profiles) were selected to participate in the study, where one outlet operated as the experimental outlet and the other as the comparison outlet. These outlets were located near multiple food outlets and were open Monday to Friday from 10.00 to 19.00 hours. Both the food outlets offer similar foods and consist of protein, vegetables and carbohydrates. The two food outlets were regularly visited by students and staff from the university. Most of the customers were students from the university (aged between 18 and 35 years). All food items from both outlets were analysed using The New Zealand National Healthy Food and Drink Policy based on the NZ dietary guidelines, and its criteria were used to determine the healthier items in both outlets[35]. For 4 weeks, four out of six menu items (barbacoa bowl, bean taco, chicken burrito and vegetable salad) at the experimental outlet were labelled with a tick ✓ symbol to identify them as healthier options on the menu, and a large pull-up information banner was placed next to the menu board to explain the symbol and survey (Figs 1 and 2). Four out of six menu items (spicy lemongrass chicken bowl, beef bean stew, chicken wrap and papaya salad) were also identified as healthier in the comparison outlet, but these were not symbolled. Food sales data were collected from both outlets during this time, and surveys were completed by customers of the experimental outlet at the POP. The survey took approximately 3 minutes to complete, and the customers at the experimental outlet completed these surveys while waiting for their food to be ready. Written informed consent was obtained from all customers completing the survey. Following the intervention period, the banner was removed; however, the symbols on the targeted items in the experimental outlet remained on the menu (Fig. 2).

Sample description

A convenience sample of staff and students who were regular customers of the two outlets were asked to complete the survey. Individuals were eligible for the survey if they had purchased food from the experimental outlet, were over the age of 18, were a student or staff at the university and had not previously completed the survey. One hundred and seventy-eight customers completed the survey at the POP. One participant was excluded from the sample for not meeting the inclusion criteria. Eighteen participants were excluded for incomplete survey responses, resulting in a total of 159 participants. The experimental food outlet serves, on average, 400 university staff and students a day, and so, according to the criteria for the calculation of response rate #4 of the American Association for Public Opinion Research[36], the response rate for the survey was 39·75 %.

Data collection

The present study was split into three observation periods. Observation 1 consisted of baseline data collection for 4

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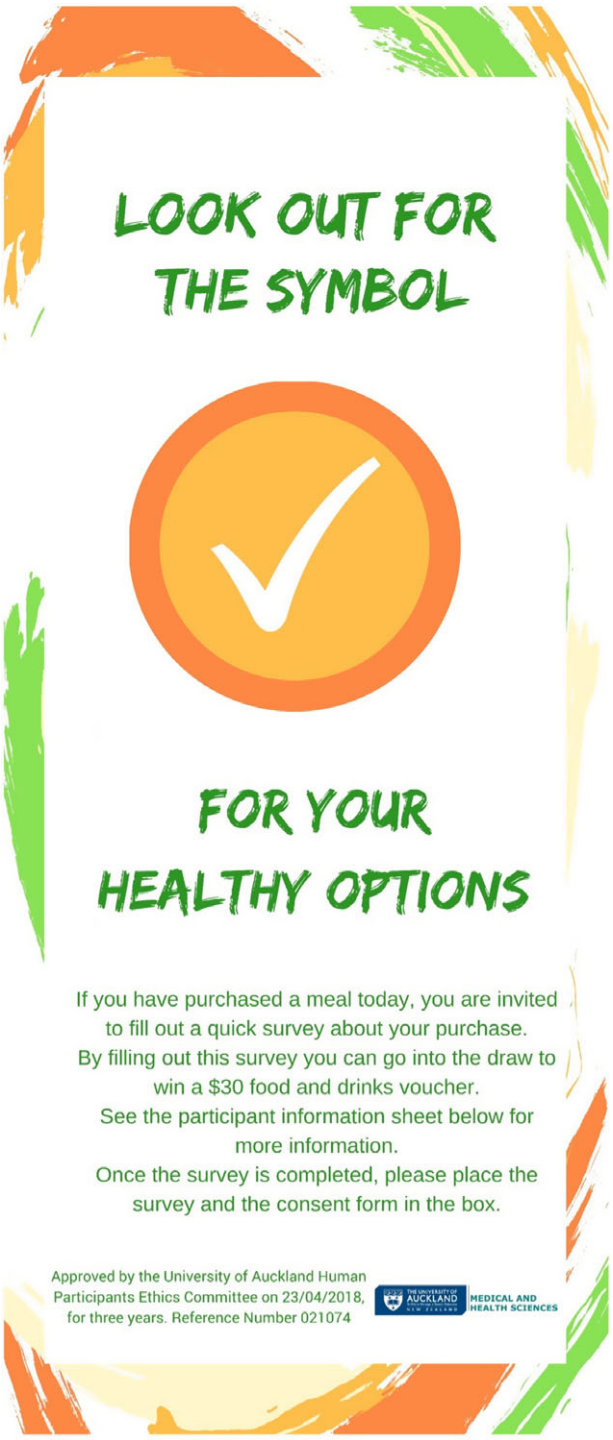

Fig. 1 Design of symbols and information banner used at the experimental outlet

weeks at both outlets before any changes were made on the menu. This was followed by observation 2, which operated as the intervention period. Data were also collected via customer surveys during observation 2. A research assistant was stationed by the food outlet and intercepted the customers after they had made a purchase while they were waiting for their meal. In the survey, participants were first asked to report what they had purchased. The second question asked participants to state what factors influenced their purchase in an open-ended question format. They were prompted with suggestions below the question, for example, convenience, taste, price, preference, health/nutrition and other (please specify). Participants were then asked whether they noticed the healthy option symbols and banner. If participants answered yes, they were asked whether the symbols had influenced their purchase. Participants were then asked (1) whether they believed they would use the symbols in the future, and (2) to select two of the seven barriers that were most significantly preventing them from purchasing healthier options. Demographic information (age, gender, occupation) was obtained on the same form. In appreciation for completing the survey, participants were provided with an opportunity to enter a draw for a $30 food and drinks voucher. The final data collection period was observation 3 for 6 weeks, which followed the end of the intervention period and ran for 4 weeks. During this time, sales data were collected from the experimental outlet to determine the long-term effects of the symbols.

Statistical analysis

Statistical analysis conducted on the sales data included a Wilcoxon matched pairs signed-rank test to analyse the differences in sales of each individual targeted item at different observation periods. Pearson's χ^2 test (two-tailed) and Fisher's exact test were conducted to compare the total targeted and non-targeted items sold during different observation periods at both food outlets and only at the experimental outlet for observation 3. Mean, standard deviation, proportions and percentages of demographics of survey participants were calculated. Percentages were also calculated to determine responses to survey questions. Statistical analysis was conducted using Pearson's χ^2 (two-tailed) and Fisher's exact test to determine significant differences in purchasing factors. Relative risk was used to determine the likelihood of using and being influenced by the symbol as a function of the chosen purchasing factor, and the Koopman asymptotic score was used to calculate the CI of the relative risk. Data were analysed using GraphPad Prism software[37]. For all statistical analyses, significance was determined by a P-value $< 0{\cdot}05$.

Results

Food sales

The outcome measure was the sales of targeted foods as a percentage of total food sales. At both experimental and comparison outlets, the most popular item purchased during all observation periods was a targeted healthy item. Wilcoxon matched pairs signed-rank test showed no significant differences between the three observation periods

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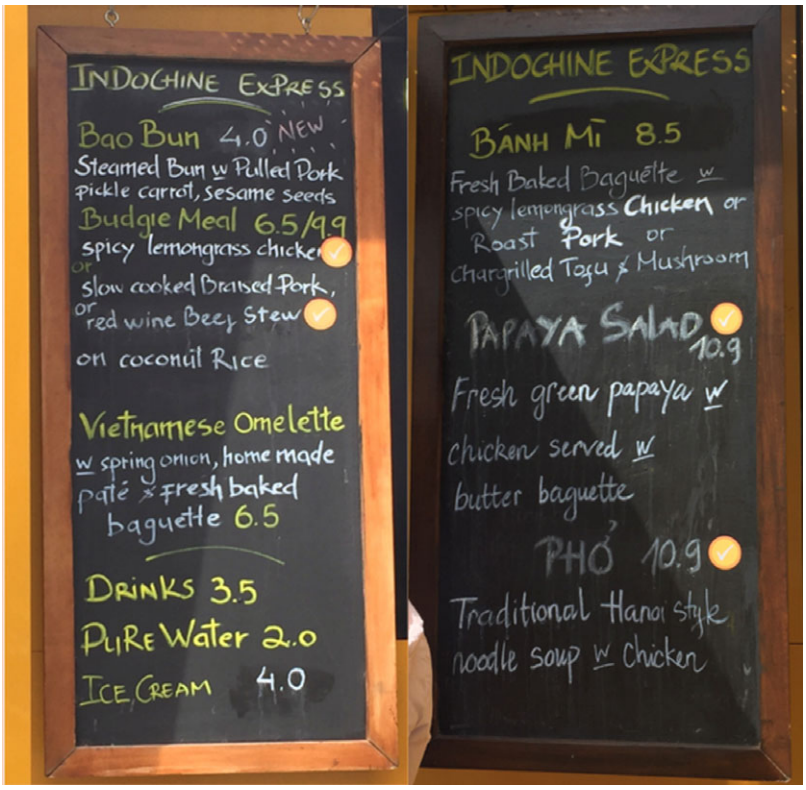

Fig. 2 Experimental outlet menu with symbols of targeted healthy food items

Table 1 Sales of targeted food items with symbols on the menu as a percentage of total sales at experimental and comparison food outlets

	Sales at experimental food outlet		Sales at comparison outlet	
Observation period	Targeted items sold per 4-week observation period	Percentage of targeted items sold (%)	Targeted foods sold per 4-week observation period	Percentage of targeted items sold (%)
Observation 1 (baseline)	1248	55·74	535	22·37
Observation 2 (intervention)	1046	55·55	465	14·11
Observation 3 (post-intervention)	1587	60·78	–	–

for each individual targeted item at the experimental outlet. At the comparison outlet, no significant differences were seen between the baseline and intervention periods for all four targeted items. Table 1 displays the total targeted items sold per 4-week observation period and as a percentage of total sales at both outlets during different observation periods. The sales of targeted food items increased at the experimental outlet. χ^2 test for the analysis of total sales of targeted *v.* non-targeted items at different observation periods yielded statistically significant results. There was a 5·23 % increase in the sales of targeted items between the intervention period (55·55 %) and the post-intervention period (60·78 %) ($P = 0·0002$). A 5·04 % increase in targeted items was also observed between the baseline (55·74 %) and the post-intervention period (60·78 %) ($P = 0·0004$). Between the baseline and the intervention period at the experiment outlet, a 0·19 % decrease in sales of targeted items was observed. At the comparison outlet, there was an 8·26 % decrease in the sale of targeted items between the baseline (22·37 %) and the intervention period (14·11 %) ($P < 0·0001$).

Customer surveys

Table 2 displays the mean, standard deviation and percentages of demographics of survey participants.

Awareness and influence of symbols

Most of the participants reported noticing the symbols and banners when making their purchase (68 %), whereas 32 % reported not noticing the symbols on the menu. Of the participants who noticed the symbols (*n* 108), 30 % reported

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Table 2 Mean, standard deviation and percentages of demographics of survey participants

	n	%
Total participants	159	
Gender		
Male	57	35·85
Female	101	63·52
Gender diverse	1	0·63
Age		
Mean age	25·51	
SD	8·82	
18–24	103	64·78
25–34	32	20·13
35–44	15	9·43
45–54	7	4·40
55–64	1	0·63
65–74	1	0·63
Occupation		
Staff	23	14·47
Student	126	79·25
Other	7	4·40
Both (staff and student)	3	1·88

being influenced by the symbols when making their purchase. If the participants were not influenced by the symbols, they were asked whether these symbols could potentially influence their purchases in the future. The survey responses revealed that these symbols have the potential to influence most participants (84 %) in the future. No significant differences in responses were observed between genders, age groups or occupations in noticing and being influenced by symbols.

Purchasing factors

Taste was selected by 66 % of all respondents, followed by price (59 %) and then health and nutrition (26 %) as most important purchasing factors.

Among the participants who were influenced by the symbols, only 53 % selected taste as a factor influencing their purchase ($P = 0{\cdot}04$). Participants who were influenced by symbols were less likely to select taste as a factor influencing their purchase (RR = 0·71, $P = 0{\cdot}04$, 95 % CI 0·48, 0·96) than those who reported not being influenced by symbols. The most commonly selected factor influencing these participants' purchases was price (66 %). Among these participants, 34 % reported health and nutrition as a factor influencing their purchase ($P = 0{\cdot}34$). This group of participants (100 %) also selected 'yes' to being influenced by symbolled menu items in the future. No statistically significant differences were observed for factors influencing purchases between genders, occupation, and younger (18–24 years) *v.* older young adults (>25 years).

Sixty-one participants were not influenced by the symbols at the time of purchase, but selected 'yes' to being influenced by them in the future. Seventy-four per cent of these participants selected taste as the most important factor influencing their purchase. Many of these participants (59 %) also selected price. Health and nutrition were selected by only 23 % of participants in this group, which was slightly less than the percentage of participants who selected health/nutrition from the total sample (26 %).

Barriers to purchasing healthy options

The most significant barrier to purchasing healthy food was price, with 72 % of all participants selecting it, followed by a limited selection of healthy options (42 %). Price (72 %) was also the main barrier to purchasing healthy food for participants who were not influenced by the symbols but may be influenced in the future. Young adults who were aged between 18 and 24 years were more likely to select price as a barrier to purchasing healthy food in comparison to young adults who were aged >25 years (RR = 1·32, $P = 0{\cdot}04$, 95 % CI 1·02, 1·88). In both genders, price was the most common selection, with 70 % of males selecting it and 72 % of females. More females selected 'limited healthy options' (46 %) in comparison to males (33 %), and more males selected 'unaware of healthy options' (30 %) in comparison to females (19 %); however, these were not statistically significant. The older group (>25 years) had a higher percentage of participants who selected 'limited healthy options' as a barrier (54 %) in comparison to younger (18–24 years) adults (39 %); however, these findings were not statistically significant either.

Discussion

A POP nutrition intervention in the form of symbols targeting healthier foods resulted in an increase in sales of these symbolled menu items over time. The present study contributes to the limited research currently available on the effectiveness of symbols on menus. Of other studies conducted in a real-life setting, which also used sales data as an outcome measure, only one has found significant increases in the sale of targeted items[23]. Positive shifts towards healthier choices have also been found in other studies, with significant decreases in calories selected[38]; however, others have been found to be non-significant[39], and another study found no difference[40]. Many studies exploring menu labelling have noted that a short study period may explain why significant findings have not been observed[26,39,41,42]. It is thought that for individuals to make a change, repeated exposure is required before the change occurs[41,42]. Therefore, the prolonged study period, with greater exposure time to the symbols, provided more promising findings in this study.

Studies that include mostly young adult participants have found mixed results with the implementation of different menu labelling formats[43-49]. In the present study, one-third of the sample did not notice the symbols, and only 30 % of those who noticed them (20 % of the total sample) reported being influenced by them, and this was dependent on the purchase factors that consumers considered most important

https://doi.org/10.1017/S1368980020002840 Published online by Cambridge University Press

such as taste and price, and what they considered as barriers to purchasing healthy foods. The findings revealed that there were no differences between genders, age groups and occupations in this population group, suggesting that this labelling format may be viable among all groups in this setting. It supports a few other real-world-setting studies that have also found significant findings with the implementation of symbols on menus[23,38]. Few studies have identified that some labelling formats, such as calorie labelling, may be limited in their effectiveness due to a particular level of health literacy required to understand them[18,50]. A low level of health literacy is associated with poorer health outcomes[51]; therefore, it is crucial that people at a higher risk of poor health outcomes can understand and use the nutrition labels provided to reduce inequities. The intervention in this study used no written materials other than an information banner with minimal words. It relied primarily on a single symbol to denote healthier foods on the menu, thereby making it accessible to young adults with a range of literacy skills[23].

Taste and price were the most commonly reported factors influencing young adults' purchases in the present study, and this is consistent with the literature[28,29]. Young adults purchase tasty food, and food is made tasty with high amounts of fat, sugar and sodium[52], commonly resulting in the consumption of energy-dense, nutrient-poor foods among this age group. One possible way to increase the consumption of healthy options is by enhancing taste expectations[53]. Altering the name of the food item on the menu to sound more appealing was effective in a previous study, where a 27 % increase in the sale of a menu item was observed following the change in names and descriptions of the foods[54]. Subtle recipe alterations could potentially improve the nutritional quality of food, for example, opting for unsaturated fats rather than saturated fats, baking or shallow frying instead of full frying, and adding hidden vegetables.

Price is a commonly reported factor influencing purchase behaviours in university young adults[55], and it was also identified as the main barrier for purchasing healthy foods in the present study. Studies have identified that young adults perceive healthy foods as more expensive than unhealthy foods[55,56], and price is a commonly reported barrier to purchasing healthy foods by this age group[30,31,56]. The present study indicated that as age increases, price might be less of a barrier to purchasing healthy foods. On average, 18–24-year-olds have lower incomes than the 25–34-year-olds[57], which may explain why price is more of a barrier. In a couple of other studies, young adults have identified reducing the costs of healthy foods as the top recommendation to help increase their consumption of such foods[55,58,59]. Reducing the prices of healthy foods by 20 % at a university cafeteria resulted in a reduction in the purchases of unhealthy foods[60]. Therefore, in the future, for positive changes in purchase behaviour among young adults, the price barrier must be addressed.

Health and nutrition were ranked low as a purchasing factor by consumers in this setting. Studies looking at factors influencing consumers' purchases have found that those who consider health and nutrition as an essential factor are more likely to report using the nutrition information at POP[29,32]. However, the relationship between health and nutrition as a purchasing factor and the use of symbols was non-significant, possibly due to health and nutrition being a low priority for young adults[59]. A study looking at factors influencing purchases alongside the implementation of nutrition labelling found that there was an increase in the priority of health and nutrition with the implementation of nutrition labelling alone[29]. In another study, a marketing campaign alongside nutrition labels on menus at the POP showed positive results[61]. However, the addition of a social marketing campaign alongside calorie labelling on menus in another study found no changes in purchasing behaviour[62]. In order to engage young adults in these education and marketing campaigns, the use of social media may provide a suitable platform to present these messages[63]. If nutrition labelling alone can increase the priority of health and nutrition, then the addition of education and marketing may have an even greater impact, resulting in more significant changes in purchasing behaviours in the future.

A lack of healthy options was, however, one of the top barriers to eating healthy foods in this and other studies[56,64]. With the abundance of energy-dense, nutrient-poor foods in the current food environment, the presence of healthy options is sparse. Increasing the availability of healthy foods in the future will likely result in an increased consumption of these foods[55,65]. A possible way to increase the supply of healthy options is working with vendors to improve the nutritional quality of their foods. One indirect, positive effect of food labelling is the awareness it creates among food vendors/industry regarding the nutritional quality of their food, and they have modified their recipes following an analysis of their menu items so that the nutritional quality of their items improved[66]. This could help improve the nutritional quality of the current food and potentially also increase the number of healthy foods if new products are also added to menus.

Strengths and limitations

The present study was conducted in a real-world setting, thus strengthening the ecological validity of the study; the length of the study and the repeated measures allowed for behaviour change to occur. However, data were not collected from the comparison food outlet at observation 3. The collection of sales data provided an objective outcome measure for the change in purchasing behaviour. Data from the surveys provided supporting evidence that customers were aware of the symbols and were influenced by them. The use of both measures enhanced the construct validity of the study. Due to no menu items meeting the

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criteria for the green category in the National Healthy Food and Drink Policy, it was decided that the colour chosen for representing these symbols would be amber. Ideally, the symbol would have been green, due to it commonly being associated with health and wellbeing. Furthermore, even though the outlets were carefully matched, the two outlets were different in relation to selling healthy options. At baseline, the sale of healthy options was higher in the experimental outlet (55·74 %) than the comparison outlet (22·37 %). The costumers of the experimental outlet could have been more interested in healthy options compared with the comparison outlet, and the results of the present study should be considered in light of this difference. However, at both experimental and comparison outlets, the most popular item purchased during all observation periods was a targeted healthy item (not symbolled at the comparison outlet). Some participants did ask about the choice of colour for the symbol. However, overall, it did not have a significant effect on participants using the symbol, as similar rates of awareness and use of symbols were observed in previous literature. Surveys were conducted immediately following participants purchasing their food to minimise recall bias. The survey data may be subject to response bias however, as participants may have reported untruthful responses. This may be due to wanting to provide socially acceptable answers, or due to some participants answering the survey while their peers were alongside them. However, this is unlikely to have had a significant impact on the results. The specific university setting and sample of young adults (18–34 years) used in the present study makes it difficult to generalise these findings to the whole population due to the participants' education level and age.

Conclusions

The present study aimed to determine the effectiveness of a nutrition labelling programme using symbols to identify healthier food items on menus at an university takeout food outlet. Findings provide evidence that the implementation of symbols to identify healthier menu items resulted in healthier food choices over a period. The present study provides evidence that the implementation of symbols on menus is feasible in this setting and, therefore, could be potentially rolled out across multiple food outlets at the university. Taste is an important purchasing factor among young adults and should be considered when trying to impact their purchasing behaviours. Price and availability of healthy options are commonly reported barriers to eating healthy foods, and future research must address these barriers. Further research is required to determine the effectiveness of symbols in different settings among different population groups and additional ways to enhance better food choices at the POP.

Acknowledgements

Acknowledgements: The authors thank retail food operators at the university for participating in the research and the food outlet customers who completed the surveys. *Financial support:* This work was supported by the Food and Health Programme funding within the university. *Conflict of interest:* The authors declare that they have no competing interests. *Authorship*: R.R. conceived the study; R.R. and D.A. developed the research questions; D.A. collected and analysed the data. Both authors contributed to the writing of the article. *Ethics of human subject participation:* The present study was conducted according to the guidelines laid down in the Declaration of Helsinki, and all procedures involving human subjects/patients were approved by the University of Auckland Institutional Review Board. Approval was obtained from the University of Auckland Human Participants Ethics Committee on 23 April 2018 for 3 years (reference number 021074). Written informed consent was obtained from all participants. *Consent for publication:* Not applicable. *Availability of data and materials:* The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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