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Authors	Geaney, Fiona;Harrington, Janas M.;Fitzgerald, Anthony P.;Perry, Ivan J.
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The impact of a workplace catering initiative on dietary intakes of salt and other nutrients: a pilot study

F Geaney*, J Harrington, AP Fitzgerald and IJ Perry
Department of Epidemiology and Public Health, University College Cork, Room 2.62, Brookfield Health Sciences Complex, College Road, Cork, Republic of Ireland

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Abstract

Objective: Owing to modern lifestyles, individuals are dependent on out-of-home eating. The catering sector can have a pivotal role in influencing our food choices. The objective of the present study was to examine the impact of a structured catering initiative on food choices in a public sector workplace setting.
Design: A cross-sectional comparison study in two hospitals, one of which had implemented a catering initiative designed to provide nutritious food while reducing sugar, fat and salt intakes.
Setting: Two public sector hospitals in Cork, Ireland.
Subjects: A total of 100 random participants aged 18–64 years (fifty intervention, fifty non-intervention) who consumed at least one main meal in the hospital staff canteen daily. Each respondent was asked to complete one anonymous 24 h dietary recall and questionnaire. Food and nutrient analysis was conducted using WISP (Weighed Intake Software Program).
Results: Reported mean intakes of total sugars ($P < 0{\cdot}001$), total fat ($P < 0{\cdot}000$), saturated fat ($P < 0{\cdot}000$) and salt ($P < 0{\cdot}046$) were significantly lower in the intervention hospital when adjusted for age and gender. In the intervention hospital, 72 % of respondents, compared with 42 % in the non-intervention hospital, complied with the recommended under-3 daily servings of food high in fat and sugar ($P < 0{\cdot}005$). In the intervention hospital, 43 % of respondents exceeded the recommended salt intake of 4–6 g/d, compared with 57 % in the non-intervention hospital.
Conclusions: Structured catering initiatives in the workplace are a potentially important option in the promotion of healthy food choices. Targeted public health programmes and health policy changes are needed to motivate caterers in the public sector and other industries to develop interventions that promote a healthy diet.

Keywords
Workplace catering initiative
Dietary salt intake
Health promotion

Diet and nutrition are important determinants of health and longevity. There is now a clear scientific consensus on the role of diet in the prevention of chronic diseases and major causes of death, including CVD, type 2 diabetes and specific causes of cancer[1]. There is increasing evidence that the catering sector can have a pivotal role in influencing our food choices[2]. In Ireland, mortality rates from CHD remain among the highest in Europe[3]. Approximately 35 % of deaths are due to CVD[4]. In the context of CVD prevention, there is currently a significant focus on the need to reduce dietary salt intake because of the evidence of a causal role of salt in the aetiology of hypertension and CVD[5] and the opportunity to achieve population-wide reductions in salt intake through collaboration with food processors and the catering sector. For instance, in the USA, it is estimated that a reduction in average dietary salt intake of 3 g/d would reduce the annual number of incident CHD cases by 60 000–120 000, stroke by 32 000–66 000 and myocardial infarction by 54 000–99 000, and reduce the annual number of deaths from any cause by 44 000–92 000. It was also estimated that a regulatory intervention designed to achieve a reduction in salt intake of 3 g/d would produce a saving of 194 000–392 000 quality-adjusted life-years and $US10–24 billion in health-care costs annually[5].

Workplace health promotion has been associated with a reduction in health risks[6]. In Western countries, it is recognised that employees are increasingly relying on their workplace to provide many of their daily meals, in particular breakfast and lunch[7]. Thus, workplace catering arrangements can have the potential to influence food consumption choices[8].

Workplace dietary interventions have included positive measures to influence food choice such as price reductions

**Corresponding author:* Email f.geaney@ucc.ie
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on healthy options and increasing the access and appeal of healthy food[9]. In a '6-a-Day' Work-site Canteen Model Study in Denmark, it was reported that employees' total consumption of fruit and vegetables significantly increased when strategies were used by caterers to create appealing meals that were rich in fruit and vegetables. These strategies included mixing fruit and vegetables in rice, pasta and mashed potatoes, increasing the serving size of vegetable accompaniments and thickening sauces and soups with puréed vegetables[10].

Data are limited on catering interventions designed to promote healthy food choices in the public sector. The aim of the present study was to examine dietary intakes in a cross-sectional comparison study involving staff in two hospitals, one of which has implemented a catering initiative focused on reducing dietary salt intake since 2007.

Methods

General study design

The present study was a cross-sectional comparison study of salt and dietary intakes in a representative sample of adults aged 18–64 years working in two public sector hospitals: one with the catering initiative (intervention) and one without a specific catering initiative (non-intervention).

The intervention

The focus of the catering initiative was to provide nutritious food options for staff, with particular focus on reducing salt intake. In 2007, the caterers implemented changes such as restriction of food high in salt, fat and sugar. All menus were modified to ensure that the healthiest option was available for patients and staff. Purchasing orders for high-salt products (gravy mixes, stock cubes) and processed meat (bacon, corned beef) were replaced with low-salt options (turkey, chicken and fish). Fresh herbs, spices and garlic were introduced to develop additional flavour. Salt was removed in all cooking processes. In the staff canteen, salt was removed from the tables but small salt sachets were available at service. Nutrition information on salt reduction and a healthy diet was displayed in the canteen area. No sauces or accompaniments were added to any meals without the customer's consent. Staff members were encouraged to consume extra salad and vegetable options with no extra cost. Cooking methods with oil were limited. All desserts were fruit-based. The non-intervention hospital did not follow a specific catering initiative. In the non-intervention hospital, both healthy and unhealthy options were available from the staff canteen.

Subjects

A random sample of 100 individuals took part in the study (fifty staff from each hospital). Individuals were eligible for the study if they consumed at least one main meal in the hospital staff canteen daily. Individuals were approached consecutively at the cash register in the staff canteen during lunch and dinner breaks (12.30–14.00 hours) after they had made their food choice and asked to participate in the study by the research assistant. In the intervention hospital, all individuals who were asked to participate agreed. Less than five in the non-intervention hospital refused to participate in the study.

Data collection

All respondents were asked to participate in the study during the time of meal consumption (12.30–14.00 hours). Participants were asked to complete one anonymous 24 h dietary recall and a questionnaire.

The questionnaire was self-completed by each participant before the 24 h dietary recall. The questionnaire was an adapted version previously used as a survey for health service staff[11]. The questionnaire consisted of sixteen questions, divided into four sections: demographic (gender, age); work environment (category of work, job security, job arrangement and hours of work); dietary perceptions (self-rated health, general dietary habits in the past year, salt dietary habits); and eating habits at work (dietary habits at work, salt intake at work).

The 24 h dietary recalls were completed with the aid of the researcher using a standardised method. The research assistant observed the participant's meal choice and recorded it. The participant was asked by the research assistant to recall their dietary intake for the previous 24 h. Each data collection took approximately 30 min. An alternative time was arranged between the participant and researcher if the mealtime was inconvenient.

Food analysis

Each 24 h dietary recall data entry was compared with the recommended servings of the Irish Food Pyramid. For the general adult population, the Irish Food Pyramid recommends that six or more servings of cereals, bread, potatoes, rice and pasta, five or more servings of fruit and vegetables, three servings of milk, cheese and yoghurt and two servings of meat, fish, poultry and alternatives be consumed daily. It is recommended that less than three servings of food high in fat and sugar (e.g. oils, butter and cakes) be consumed daily[12].

Food and nutrient analysis was conducted using WISP© (Weighed Intake Software Program; Tinuviel Software, Warrington, UK). WISP uses data from *McCance & Widdowson's The Composition of Foods*[13], plus supplemental volumes, to generate nutrient intake data[14–16]. Mean intakes of food energy, micro- and macronutrients, salt, saturated fat and total sugars were calculated.

Statistical analysis

Data were recorded manually and entered electronically into the Statistical Package for the Social Sciences statistical software package version 15·0 for Windows™

Table 1 Mean food and nutrient intakes in the intervention and non-intervention hospitals adjusted for age and gender

	Intervention		Non-intervention		Difference		
	Mean	SD	Mean	SD	Mean*	95% CI	*P* value
Food energy intake (kcal/d)†	1628·6	406·3	1900	450·8	298·7	126·3, 471·1	0·001
Total sugars (g/d)	68·7	34·2	89·5	36·2	25·27	10·67, 39·87	0·001
Sucrose (g/d)	31·3	18·9	34·6	20·4	0·969	−7·05, 8·99	0·811
Fructose (g/d)	10·8	8·3	13·2	8·5	2·7	−0·8, 6·12	0·131
Total fat (g/d)	60·5	22·5	83·9	30·4	23·4	12·69, 34·2	0·000
Saturated fat (g/d)	20·7	10·1	31·9	14·0	11·4	6·45, 16·39	0·000
Protein (g/d)	79·8	18·9	83·0	22·0	5·9	−2·124, 13·9	0·148
Carbohydrates (g/d)	204·2	61·3	215·6	50·9	15·5	−7·95, 38·95	0·193
Salt (g/d)	5·6	2·7	6·7	2·9	1·04	0·21, 2·06	0·046
K (mg/d)	2815·2	853·2	2983·3	835·5	300·1	−41·65, 641·8	0·085
Ca (mg/d)	664·8	299·5	855·5	320·6	223·3	94·18, 352·4	0·001
Fe (mg/d)	9·4	2·9	10·0	3·6	0·693	−0·622, 2·13	0·280
Vitamin B_6 (mg/d)	2·4	0·68	2·3	0·66	0·18	−0·25, 0·29	0·895
Vitamin B_{12} (mg/d)	4·5	2·5	4·2	2·1	−0·209	−1·18, 0·76	0·670
Vitamin C (mg/d)	84·5	72·6	92·4	53·1	12·35	−13·17, 37·88	0·339
Vitamin D (μg/d)	3·6	3·1	2·5	2·5	−0·993	−2·19, 2·06	0·103

*Adjusted for age and gender.
†1 kcal = 4·184 kJ.

(SPSS Inc., Chicago, IL, USA) before statistical analysis. Data manipulation and statistical analyses were conducted using the SPSS program. Proportions in the intervention and non-intervention hospitals were compared using Pearson's χ^2 analysis. Mean levels of macronutrients, fibre, salt, fruit and vegetable intakes in the intervention and non-intervention hospitals were compared and evaluated using independent sample *t* tests. A linear regression model was used to allow for the potential confounding effects of age and gender.

Ethical approval

The Social Research Ethics Committee in University College Cork approved the study. Permission was granted for the study by the chief executives and catering officers in both hospitals.

Results

The gender distribution in both hospitals was broadly similar. More women participated in the study (intervention: 74%, non-intervention: 80%). The intervention hospital had fewer younger respondents (aged 18–44 years: 50%) in comparison with the non-intervention hospital (aged 18–44 years: 78%). In both hospitals, respondents were working in permanent (intervention: 92%, non-intervention: 78%), full-time (intervention: 70%, non-intervention: 76%) and day-time (up to 8 h) positions (intervention: 74%, non-intervention: 86%). The majority of respondents in the intervention hospital worked in management/administration (32%) and nursing (26%) categories. In the non-intervention hospital, most respondents held management/administration (50%) and allied health professional (20%) roles.

Compliance with the Irish Food Pyramid was examined. Significantly, 72% of respondents in the intervention hospital, compared with 42% in the non-intervention hospital, complied with the recommended under-3 daily servings of food high in fat and sugar (e.g. oils, butter and cakes; $P < 0{\cdot}005$). Respondents in the intervention hospital were more likely to comply with the recommended six or more servings of cereals, bread and potatoes. However, more respondents in the non-intervention hospital consumed the recommended servings for meat, fish, poultry and alternatives (two servings), milk, cheese and yoghurt (three servings), fruit and vegetables (five or more servings). This may reflect the higher energy intake in the non-intervention hospital as shown in Table 1 ($P < 0{\cdot}001$).

Table 1 shows a breakdown of nutrient intake adjusted for age and gender in the intervention and non-intervention hospitals. Overall mean intakes were significantly lower for total sugars ($P < 0{\cdot}001$), total fat ($P < 0{\cdot}000$), saturated fat ($P < 0{\cdot}000$) and salt ($P < 0{\cdot}046$) in the intervention hospital compared with the non-intervention hospital. The mean salt intake in the intervention hospital (5·6 g/d) did not exceed the recommended 6 g/d, compared with a mean salt intake of 6·7 g/d in the non-intervention hospital. Respondents in the non-intervention hospital were significantly more likely to reach the RDA for Ca, 800 mg/d ($P < 0{\cdot}001$). Respondents in the non-intervention hospital had a higher Fe intake but not significantly so. Respondents in both hospitals successfully reached the RDA for vitamins B_6, B_{12} and vitamin C. Mean intakes for vitamin D fell within the lower limits of the recommended intake range in both hospitals (RDA = 0–10 μg/d).

The pattern of discretionary salt intake was also analysed. A total of 63% of respondents self-reported 'rarely/never' using salt while cooking in the intervention hospital compared with 45% in the non-intervention hospital. In the intervention hospital, 56% respondents self-reported 'rarely/never' using salt at the table compared with 50% in the non-intervention hospital.

Discussion

In this small observational study, we have shown that a structured catering initiative in a public sector setting has potential to reduce dietary intakes of salt, fat and sugar. It was noteworthy that the energy intake was also lower in the intervention hospital. This reflects the lower dietary intakes of total sugars and saturated fat in the intervention hospital. More respondents in the non-intervention hospital were exceeding dietary salt intake guidelines. It should be noted that the majority of staff were working in 8 h shifts; therefore, not all meals within the 24 h period were consumed in the hospital. This suggests that there may be some carryover from the workplace to the home environment. However, it should also be noted that respondents in the intervention hospital had lower Ca and Fe intakes. This highlights the need to consider both positive and negative impacts of workplace catering initiatives designed to promote a healthy diet.

The present study has a number of limitations, including the use of a cross-sectional as opposed to a longitudinal study design, lack of baseline measurements and data on potential confounders such as smoking and alcohol, and reliance on a single 24 h dietary recall to assess dietary intakes. Thus, inference on the impact of this catering initiative must be tentative. In particular, it may be suggested that the findings are due to reverse causation; that is, the selection of a workplace restaurant offering healthy choices by more health-conscious staff. However, staff in this workplace do not have a choice of restaurants and are unlikely to eat off campus because of the lack of alternative restaurants within a reasonable distance from the campus. Although the 24 h dietary recall method is an efficient method of data collection, with little burden on participants, it will be important in future work to obtain multiple 24 h dietary recalls, including weekday and off-duty periods, to assess potential carryover from the workplace to the home and other settings.

The reference method for analysing dietary salt intake is 24 h urinary Na. Approximately 95 % of dietary Na is excreted through the urine, with minimal losses in sweat and faeces[17]. In further work on the impact of catering interventions, data on 24 h urinary Na excretion would be invaluable. It will also be important in future work to obtain good data on smoking, alcohol and work environment, given the effect of these confounders on dietary choices[18].

The present study complements and extends the findings from other worksite nutrition interventions. A study in Finland showed that a worksite vegan nutrition programme influenced nutrient intake when caterers produced low-fat vegan options, combined with nutrition education and support in the form of a dietitian, cooking instructor and a physician. They reported an increased intake of protective factors such as folate, vitamin C and fibre and decreased intakes of total fat, saturated fat and cholesterol[19]. The present study provides evidence that nutrition interventions can influence food at work. In particular, the study findings suggest that a structured catering initiative sustained over a relatively long period (2 years in this instance) may produce long-term positive effects on food choices at work and at home. Important stakeholders such as the catering management, chefs and advisory committees (nutritionist, dietitian) can promote the maintenance of a catering initiative in the workplace through organisation, teamwork and ongoing evaluation. However, there is a clear need to extend these preliminary findings in large-scale intervention studies to a range of workplace settings.

Conclusion

In summary, the findings from the present study suggest that the workplace can be a supportive and influential environment in the promotion of a healthy diet. In many countries worldwide, the public sector is a major employer with significant opportunities to promote healthy diets in the workplace. There is a need for large-scale intervention studies in a wide range of public sector settings to provide the evidence base for policy in this area.

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