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Research report

Effectiveness of offering healthy labelled meals in improving the nutritional quality of lunch meals eaten in a worksite canteen ☆

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ABSTRACT

Healthier meal selections at restaurants and canteens are often limited and not actively promoted. In this Danish study the effectiveness of a healthy labelling certification program in improving dietary intake and influencing edible plate waste was evaluated in a quasi-experimental study design. Employees from an intervention worksite canteen and a matched control canteen were included in the study at baseline (February 2012), after completing the certification process (end-point) and six month from end-point (follow-up) (total $n = 270$). In order to estimate nutrient composition of the consumed lunch meals and plate waste a validated digital photographic method was used combining estimation of food intake with food nutrient composition data. Food satisfaction was rated by participants using a questionnaire. Several significant positive nutritional effects were observed at the intervention canteen including a mean decrease in energy density in the consumed meals from 561 kJ/100 g at baseline to 368 and 407 kJ/100 g at end-point and follow-up, respectively ($P < 0.001$). No significant changes were seen with regard to food satisfaction and plate waste. In the control canteen no positive nutritional effects were observed. The results of the study highlight the potential of using healthy labelling certification programs as a possible driver for increasing both the availability and awareness of healthy meal choices, thereby improving dietary intake when eating out.

Introduction

Food produced and eaten outside home has consistently been associated with a high energy content as well as a relatively lower nutrient density (Kjollesdal, Holmboe-Ottesen, & Wandel, 2011; Lachat et al., 2009; Lassen, Hansen, & Trolle, 2007; Wu & Sturm, 2013). It has therefore been considered that a consequence of eating food produced outside home on a frequent basis may contribute to both less healthy dietary habits and higher odds of weight gain (Bezerra, Curioni, & Sichieri, 2012; Kjollesdal et al., 2011). At the same time food produced and consumed away from home provides an increasing proportion of the daily food energy intake, making the restaurant and food service sector an important arena for promoting healthy dietary practices as a part of a long-term solution to combat the current obesity epidemic.

Especially worksites are seen as an important arena in which behavioural patterns such as healthy eating can be promoted. Worksites provide a natural social context where most employees eat at least one daily meal during their workday. Thus, worksites could potentially reach a large part of the adult population, including many who has not traditionally been engaged in health promotion activities (Kahn-Marshall & Gallant, 2012; Lassen et al., 2011).

In recent years the food service industry has implemented various initiatives aimed at improving the healthfulness of its servings. This includes the possibility of selecting healthy side dishes in fast food restaurants (Kirkpatrick et al., 2013), more fruit and vegetables in worksite canteens (Lassen, Thorsen, Trolle, Elsig, & Ovesen, 2004; Thorsen, Lassen, Tetens, Hels, & Mikkelsen, 2010), restriction of foods high in salt, fat and sugar (Geaney, Harrington, Fitzgerald, & Perry, 2011) and providing foods with low energy density (Lowe et al., 2010). Although such changes clearly represent a step in the right direction, the healthier options are often limited and focus on specific nutritional benefits, for example low fat options (Chand, Eyles, & Ni, 2012). Furthermore, many food

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establishments do not actively inform and encourage the selection of available healthier options (Kirkpatrick et al., 2013) and customers therefore might not be aware of the nutritional quality of their meal choices (Hoefkens, Pieniak, Van, & Verbeke, 2012).

In February 2012 the Danish Veterinary and Food Administration introduced labelling freshly prepared meals with a healthy label, in form of the Nordic Keyhole symbol, to the restaurant and canteen sector as a policy option to address this situation. Since 2009 the Keyhole symbol has been found on pre-packed food products in supermarkets in Denmark, and it is now widely recognized by Danish consumers as a sign of a healthy choice. Foods eligible to carry the healthy label must fulfill certain conditions. These conditions include criteria for the maximum amounts of fat, salt and sugars, together with the minimum amount of dietary fibre and wholegrain in 25 different food groups. Table 1 shows the criteria for the food groups comprising ready-made meals. The criteria are based on the Nordic Nutrition Recommendations, which are founded on scientific evidence (Nordic Council of Ministers, 2004). Keyhole labelling in restaurants and canteens is voluntary, but the restaurants and canteens need to go through a certification process to use the label on freshly prepared products, and at least one labelled meal must be present at the daily menu. Moreover, at least one employee at the restaurant must complete a Keyhole education course and 75% of all employees must go through a webinar (or equivalent training) to be able to communicate the healthy label to the customers (Danish Veterinary, 2013).

The objective of this study was to evaluate the governmental Keyhole certification program in a quasi-experimental study design with follow up, i.e. the effectiveness of serving healthy labelled meals to improve the nutritional quality of lunch meals eaten in a worksite canteen. A further objective was to examine the customer acceptability by measuring changes in edible plate waste, total amount of sold meals and customer food satisfaction.

Materials and methods

Recruitment and study design

An employee canteen at a hospital was invited to participate in the present study, as the canteen had the ambition to become one of the pioneers in achieving the Keyhole certification in Denmark. The goal of the intervention canteen was that at least half of the meals should be healthy labelled. The intervention canteen did not expect the Keyhole certification to increase meal preparation expenses. An employee canteen at another hospital with no immediate plan to become Keyhole certified accepted to be the control canteen. This canteen was in a process of improving the eating area of the canteen. While the customer profile was comparable between the two canteens, they differed with regard to the meal serving system used. At the intervention canteen a fixed price was given for all menus, while the control canteen served buffet-by-weight., i.e. payment by the weight of the food chosen. A quasi-experimental study design was used to evaluate the introduction of Keyhole labelled meals in the intervention worksite canteen compared to the control worksite canteen. A power analysis of two-group independent samples showed that with a mean expected increase in fruit and vegetable intake of 10 g/100 g (SD 17) or a decrease in salt content of 0.25 g/100 g (SD 0.4), with a power of 80% and a significance level of 5%, at least 45 participants in each group were necessary. Employees from both canteens were included in the study at baseline (February 2012), six weeks from baseline (end-point) and six month from end-point (follow-up) (total $n = 270$). The intervention canteen completed the Keyhole certification process shortly after the baseline measurement. Beforehand, the recipes had been modified and taste tests conducted together with canteen staff to assess the acceptability of the modified foods.

The study was performed in accordance with the ethical standards of the Helsinki Declaration of 1975, as revised in 2008. At each measurement point employees were included in the study during three consecutive weekdays. The employees were randomly approached after having bought their meal and asked to participate in the study focusing on canteen food intake. The employees were told that the survey was anonymous. Furthermore photo would be taken of their trays before and after eating. The only extra task for the participants would be to fill out a short questionnaire with 9 questions. Employees were excluded if they ate lunch outside the canteen. At each collection day one to five employees declined to participate due to time scarcity. All participants gave informed consent prior to their inclusion in the study.

Food intake and edible plate waste

A validated digital photographic method including a measure of the total weight of the participants' food was used to estimate the weights of the individual foods consumed by the participants (Lassen, 2010). The participants were asked to bring their food to a photo-weighing station where a trained assistant first took a photo of the tray including the meal (Nikon COOLPIX S 210 digital camera) and then recorded the total weight of the food (the plate and possible side-dishes) (Soehnle; Vera 67002, with a precision of ±1 g). The employees were asked to return their tray when finished eating, and images were taken of the tray with possible leftovers. Edible and not-edible plate waste (peel, wrapping, etc.) were weighed separately. Each day reference meals were photographed and weighed to assist intake estimation. This procedure was accomplished by the main author trained in image analyses.

The software program, the Keyhole Calculator version 1.0 (www.fooddata.dk/keyhole/) (National Food Institute, Technical University of Denmark, Soeborg, Denmark) and the Danish Food Composition Databank (Saxholt et al., 2008) with the addition of commonly used catering ingredients were used to calculate food

Table 1
The Keyhole criteria for different ready-made meals (Danish Veterinary & Food Administration, 2013).

	Ready meals and soups	Pirogues, pizzas and non-dessert pies	Sandwiches and wraps
Energy (kJ) per portion	1670–3140 kJ (400–750 cal)[b]	min 1050 kJ (250 kcal)	min 1050 kJ (250 kcal)
Fat (E%)	Max 30[c]	Max 30	Max 30
Fruit and vegetables (g/100 g)[a]	Min 25	Min 25	Min 25
Salt (g/100 g)	Max 1.0	Max 1.25	Max 1.0
Refined sugars (g/100 g)	Max 3.0	Max 3.0	Max 3.0
Wholegrain (% of cereal part)		Min 15%	Min 15–25%

[a] Root vegetables, legumes (except peanuts) and other vegetables and/or fruits and berries (excluding potatoes).
[b] For soups min 625 kJ (150 kJ) per portion.
[c] If the product contains fish with a fat content greater than 10%, no more than 40% of the energy content in the product may originate from fat, but the fat that does not originate from fish may not constitute more than 10 g per portion.