

# Workforce gender, company size and corporate financial support are predictors of availability of healthy meals in Danish worksite canteens

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## Abstract

*Objective:* Environmental strategies at worksites may help consumers change dietary behaviour towards a more healthy diet. The present study aimed to evaluate the availability of healthy meal options at Danish worksite canteens and to identify predictors of worksite canteens providing healthy meals.

*Design:* A self-administered questionnaire was randomly mailed to 1967 worksite canteen managers. Besides information and characteristics about the canteen and the worksite, the canteen managers specified the menus available. Two different health groups (Healthy and Less Healthy) were defined in three different meal categories (Sandwiches, Hot meals and Salads) as well as a combined category (Combined) combining all the three meal categories. The characteristics of the worksites were compared with regard to the different health groups.

*Setting:* Randomly selected Danish worksite canteens.

*Subjects:* 553 Danish worksite canteen managers replied, resulting in a response rate of 29%.

*Results:* Only 12% of the canteens applied to the Healthy group combining all the three meal categories. In particular, worksites with more than 75% female employees served healthy menus on a frequent basis. The size of the worksite was positively correlated with more healthy meal options. Furthermore, the present study suggests a positive relationship between corporate financial support and the availability of healthy meal options.

*Conclusions:* Among the selected variables studied, workforce gender, company size and corporate financial support were significant predictors of the availability of healthy meal options in worksite canteens. More research is needed on the role that variance in organisation environment plays for the potential of worksite intervention, to make a difference in terms of healthy eating.

**Keywords**  
Healthy eating  
Worksite  
Corporate dining  
Nutrition

Poor eating and physical activity habits are the main causes in the development of the increasing prevalence of overweight and obesity in the Nordic countries, as well as other regions<sup>(1–3)</sup>. Worldwide, the incidence of obesity has increased over the last 30–40 years, and so has the incidence of nutrition-related diseases such as diabetes type 2. According to WHO, the obesity epidemic is one of the most serious threats to public health, and, worldwide, there are now more people overweight than underweight<sup>(4)</sup>. Together with a high intake of dietary fat, a low intake of fruit and vegetables was among the ten top selected risk factors for global mortality<sup>(4)</sup>.

Population groups of lower social economic status have the highest rate of obesity in the USA as well as in other industrialised countries. The observed inequities in access to healthy food have external costs to society,

since the consumption of energy-dense diets has been linked to higher rates of obesity, diabetes type 2 and the metabolic syndrome<sup>(5,6)</sup>. In order to prevent obesity, public health policies have to improve access to healthier foods – especially for the groups with lower educational level<sup>(7)</sup>. An obvious strategy option might be to improve nutrition in settings such as workplaces, neighbourhoods and schools<sup>(5,6,8)</sup>. Environmental strategies, such as increasing the availability of healthy food and reducing barriers towards healthy eating, may help consumers change dietary behaviour and meet the guidelines for a healthy diet.

The settings approach has gained increasing attention since the Ottawa Charter was adopted in 1986<sup>(8)</sup>. Furthermore, the workplace is a setting where it is feasible to reach individuals normally hard to reach<sup>(6,9)</sup>.

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Worksite canteens supply meals for a regular clientele, and in many cases the meal may constitute the main meal of the day. Seen from the worksite point of view, the protection of human resources through health promoting activities offers obvious advantages. Several policy papers, including the WHO second Nutrition Action Plan 2007, the EU White Paper 2007 and the Istanbul Charter 2006, call for action to be taken in the workplace eating environment<sup>(10–13)</sup>. However, these policy documents are very limited in scope when it comes to pointing out how the interventions are to be carried out, nor do they relate to the role that the type and organisation of the worksite might play<sup>(14,15)</sup>. Thus, there is a need to study the role that variance in organisation environment plays for the potential of worksite intervention to make a difference in terms of healthy eating.

The aim of the present study was to evaluate the availability of healthy meal options at Danish worksite canteens. Further, the specific objectives were to assess the characteristics of the worksite canteens being categorised as healthy, compared to those categorised as less healthy.

## Material and methods

A self-administered questionnaire was mailed to 1967 canteen managers randomly selected among available records from the database of the Canteen Managers Association in Denmark – in total, 3799 members. The mailed questionnaire included a stamped self-addressed envelope. No reminder was later sent for the non-responders since the questionnaires were mailed-in anonymously. Seventy-five questionnaires were returned to sender on account of address unknown or survey irrelevant. The relevance of the questionnaire was assessed by a group of experts, and it was pilot tested and revised to improve clarity to respondents.

The questionnaire survey focused on the nutritional quality of the menu options available at the canteen. The canteen managers were asked to specify the menus available at the canteen and characteristics about the canteen and the worksite. Based on the Nordic Nutrition Recommendations<sup>(16)</sup>, a total of thirteen questions from the questionnaire regarding the menus available at the canteens were selected as indicators of the nutritional quality of the menus. The nutritional focus was the availability and content of menu options being rich in fruit and vegetables, fish dishes, reduced-fat menus as well as the free choice of high-fat ingredients such as butter and mayonnaise, and, finally, the availability of free chilled water. Except for providing free chilled water, the questions fell into three categories: Sandwiches, Hot dishes and Salads. Fruit and snack vegetables were included in the Salad category. Questions could be answered either as a yes or no answer or as a frequency of serving selected menu items, the answers being daily, 3–4 times a week, 4–8 times a month and seldom or never.

**Table 1** Assignment of the health category Healthy (H) to different meal categories according to selected indicators of the nutritional quality of menu items available at the canteen

Meal option	Healthy options (H)
Sandwich	Options of fish and vegetable fillings at least 3–4 times a week In addition, a choice of no butter and no mayonnaise
Hot meal	Meal according to plate model* at least 3–4 times a week
Salad	Availability of daily salad. Also, availability of fruit (in pieces or whole) or snack vegetables at least 3–4 times a week
Combined	Combining all three menu options (Sandwich, Hot meal and Salad) as well as availability of free chilled water daily

\*A plate model is a plate served according to the official nutritional recommendations. 1/5 of the plate is meat, cheese, fish and eggs, 2/5 of the plate fruit and vegetables, 2/5 of the plate is rice, potatoes and bread.

Questions regarding the characteristics of the worksites (explanatory variables) included number of employees at the worksite and at the canteen (canteen staff), number of lunches served on a daily basis, serving system (either a buffet system, where a variety of food choices are offered at a fixed price or a cash *à la carte* canteen where the customers select and purchase the items for lunch, or a combination of the two serving systems), town *v.* countryside, canteen outsourced *v.* operated by the worksite, presence of a food and nutrition policy, job functions at worksite (four categories on level of sedentary work), canteen subsidised or not (food products, equipment and/or salary, respectively), and percentage of male employees at worksite (four categories of male/female employees).

The health criteria were constructed on the basis of the answers to the thirteen questions on the nutritional quality of the menus. See Table 1 for an overview. The suitability of the health criteria was assessed by a group of experts in relation to its intended purpose, and the content validity was examined in terms of how well it corresponded qualitatively with the dietary recommendations. Furthermore, the 'Plate Model' (a meal model illustrating the composition of a recommended meal) was chosen as a useful model in a slightly modified form, focusing on the relative proportions of meal components as served; for example, double amount of fruit and vegetables compared to meat, etc. The self-declared menus were evaluated and categorised into two groups depending on the relative nutritional quality of the menu options – Healthy (H) and Less Healthy (LH). More specifically, the *Sandwich* was labelled H, if options of fish and vegetable fillings were available 3–4 times weekly or more. In addition, no butter and mayonnaise option for category H was required. Regarding the Hot dish category, the label H was applied if an option of a 'plate model' (a meal model illustrating the composition of a recommended meal) was available at least 3–4 times weekly. Considering

the Salad category (including fruit and snack vegetable), the label H was assigned if salad was available on a daily basis as well as fresh fruit in pieces, fresh fruit whole or serving of snack vegetables 3–4 times a week.

A canteen fulfilling all of the mentioned options regarding all three categories, as well as providing free chilled water daily, was categorised as overall Healthy (H Combined). A canteen serving the selected menu options 3–4 times a month, less or never would be labelled as overall Less Healthy (LH Combined).

## Statistics

A large number of explanatory variables from the questionnaire were investigated with respect to their possible relation to four dichotomous dependent variables (H with respect to Sandwiches, Hot Meals, Salads and Combined) in separate multiple logistic regression analyses. This procedure raises a multiplicity issue. Since the study was explorative, the following solution was adopted. Initially, to select variables for each of the four multiple logistic regressions, all categorical explanatory variables were tested using Fisher's Exact Test<sup>(17)</sup> and all continuous explanatory variables (and a  $\log_{10}$  transformation) were tested in a logistic regression. All explanatory variables with a *P*-value below 0.2 were included in the multiple analyses. The threshold of 0.2 was chosen to include all related variables and at the same time avoid including too many variables and thereby cause co-linearity problems in the regression analyses. Furthermore, all two-way interactions were included. Reduction of the regression model was done with a likelihood ratio test at a 1% significance level. The low significance level was selected to partly correct for the multiplicity issue. Fisher's Exact Test was done in  $R$ <sup>(18)</sup> and the logistic regressions were done in S-PLUS<sup>(19)</sup>.

## Results

In total, 553 responded to the questionnaire, resulting in a response rate of 29%. In the present survey, an average worksite canteen on a daily basis provided meals for 160 customers and on average had 4.2 employees. Seventy per cent of the canteens had a buffet system (only, or in combination with a cash system), whereas 48% had a cash system (only, or in combination with a buffet system). Twenty-three per cent of the canteens stated to have a nutrition policy (results are not shown).

Table 2 shows the percentage of canteens in the survey being categorised as Healthy (H). The meal options analysed in the present study consisted of Sandwiches, Hot meals, Salads and Combined.

The majority of the canteens (85%) had salad available on the menu on a daily basis, as well as either fruit or snack vegetables 3–4 times a week, but only 12% had all the three meal options available in the Combined Healthy

**Table 2** The number of canteens being categorised as Healthy (H) for each meal options available at the canteens (Sandwich, Hot meal, Salad and Combined)

Meal option	Number of canteens	Percentage of 553 (total <i>n</i> )
Sandwich	136	25
Hot meal	323	58
Salad	470	85
Combined	69	12

category (H Combined). Looking at Sandwiches and Hot Meals, 25% and 58%, respectively of the canteens had healthy sandwiches and healthy hot meals (H) available.

Table 3 shows the results from the multiple regression analysis on the data investigating a number of explanatory variables. Looking overall at the characteristics of the worksites, especially the following variables seemed to explain the differences in availability of healthy menu options. The size of the worksite played a role; the bigger (in terms of number of lunches served on a daily basis), the higher the OR of serving healthier menu options (significant in all H categories with an increase in OR of 2.1–2.6 for an increase of 1 on the  $\log_{10}$ ). Furthermore, corporate financial support of the canteen played a role – canteens being subsidised had significantly higher odds of serving healthy menu options for two of the tested categories, including the H Combined category (OR 2.0–2.6 in favour of subsidised products). Having a nutrition policy seemed to influence the odds of belonging to the Healthy category (H Sandwich), but only with regard to sandwiches. Having a nutrition policy positively interacted with the size of the worksite, and the increase in OR (as a function of number of lunch served at worksite) was higher if the worksite had a nutrition policy. Finally, the employee profile seemed to influence the availability of combined healthy options at the canteen with respect to the sex distribution. Worksites with less than 25% male employees had fourteen times higher odds of being overall healthy, compared to worksites with more than 75% male employees (H Combined).

## Discussion

The present study is the first published Danish study to focus on the role that the type and organisation of the worksite might play in terms of healthy meal options. In an international context, Sorensen *et al.*<sup>(20)</sup> conclude, when reviewing worksite interventions, that research is needed on the mechanisms of organisational change and the processes that influence dietary changes in order to understand employee, worksite and vendor needs. In 1995, The Working Well Trial study pointed to the potential power of organisational characteristics and cultural norms, where the baseline survey gave insights into how the individual and organisational systems are likely to influence behaviours and corporate culture<sup>(21)</sup>.

**Table 3** Predictors of availability of healthy meal options: results from the multiple logistic regression analysis investigating the relationship between the health category Healthy (H) for each meal option and various explanatory variables

Meal option	Variable	OR	95% CI	P-value
Sandwich	Subsidised v. not subsidised*	2.0	1.2, 3.4	0.0079
	Nutrition policy Yes $\times$ Number of lunch served†	2.6	1.5, 4.6	0.0006
	Nutrition policy No $\times$ Number of lunch served†	2.1	1.2, 3.6	
Hot meal	Number of lunch served‡	2.4	1.4, 4.2	0.0024
Salad	Number of lunch served‡	2.4	1.2, 5.0	0.0038
Combined meal options	Subsidised v. not subsidised*	2.6	1.4, 5.0	0.0037
	Number of lunch served‡	2.6	1.3, 5.3	0.0084
	(0–25)% men v. (75–100)% men§	14.0	3.2, 99.5	0.0012
	(25–50)% men v. (75–100)% men§	7.7	2.1, 50.6	
	(50–75)% men v. (75–100)% men§	6.9	1.9, 1.4	

\*If the worksite is subsidising the canteen or not.

†Log<sub>10</sub> (number of lunches served per day) stratified on whether the workplace has a nutrition policy.

‡Log<sub>10</sub> (number of lunches served per day).

§Percentage of men at the worksite.

||Combining all three meal options (open sandwiches, hot meals and salads).

From a public health perspective, it is important that worksites in general serve meals that are healthy and easily available for the customer to select. The results from this survey show that only about one out of eight of the participating canteens fulfilled the defined health criteria for combined meal options, so the health-oriented customers have to select carefully in order get a healthy meal. This is especially true if they are having sandwiches. Only one of every four of the canteens in the present study was categorised as having healthy (H) sandwiches available. A recent Danish report looking at meals offered at worksite canteens also looks into the nutritional quality of a Danish open sandwich. The report concludes that sandwiches as well as open sandwiches are very low in fruit and vegetable content; open sandwiches, especially, are high in fat content but also high in dietary fibre because of the rye bread. Danish open sandwiches may therefore be healthy in some aspects but less healthy in other aspects<sup>(22)</sup>.

Looking at the characteristics of these worksites, the female dominated worksites (more than 75% female employees) had healthier meals available. Other studies have shown that men, compared to women, are less health conscious and consume fewer fruits and vegetables<sup>(20,23)</sup>. However, it has also been shown that easy access to attractive fruit- and vegetable-rich products, including salads, can significantly increase the intake among both men and women<sup>(23)</sup>.

The size of the worksite also plays a role; the bigger the worksite, the more healthy are the meals available. This is in line with studies showing that employees in smaller companies have limited access to participate in health promotion programmes<sup>(24)</sup>. Furthermore, the present study showed a relationship between both corporate financial support of the canteen (subsidising the meals), as well as having a nutrition policy and the availability of healthy meal options in the canteens. Having a nutrition policy seems to affect only the availability of healthy meal options in regard to sandwiches. Otherwise, in the present study, having a nutrition policy had no significant

influence on the availability of healthy meal options at the canteen.

Healthy eating is a good investment for companies since it may improve employee satisfaction, as well as have an impact on recruitment and increase efficiency at the worksite<sup>(25)</sup>. In addition, food served at worksite canteen may serve as a model of an optimal meal also influencing people's food choices on other occasions<sup>(25,26)</sup>. However, the caterer must also supply food that the consumer wishes to eat; thus, for a healthy meal to be consumed, it must both be available and selected<sup>(27)</sup>. Promoting healthy eating at worksites has been claimed to be easier towards white-collar workers than blue-collar workers, since blue-collar workers are less likely to participate in health promotion programmes<sup>(28,29)</sup>. Interventions at worksites do not require individuals to self-select into the defined programmes and therefore interventions at the worksite setting make it possible to reach the individuals normally hard to reach, e.g. the blue collar workers and men with a limited education. But the workers will not select the healthy meals if they are not appealing. Therefore, the employee demand for healthy food choices is a fine balance between price, benefits, taste and convenience<sup>(20,30)</sup>. Knowing that men with a limited education are more likely to have unhealthy eating habits among other risk factors, the implications of the present study would be to subsidise the worksite canteens with a majority of men, and especially worksites employing men with a limited education, with the goal of making healthier meal options available.

From a public health perspective also, the smaller worksites should have more healthy meal options easily available. Subsidising healthy food choices is one strategy to promote healthy dietary habits. It has been shown that taste, place and verbal encouragements are also the factors that influence the food choice in the canteen, and that support and commitment from management are other determinants for successful worksite interventions for blue-collar as well as white-collar workers<sup>(20,28)</sup>. Meiselman *et al.*<sup>(31)</sup> showed that the food environment

is important to food acceptance, where food served in a cafeteria was deemed less appetising than food consumed in a restaurant.

In this survey, only 12% of the participating canteens were categorised as having healthy meals available in all menu options (H Combined) at least 3–4 times weekly. Likewise, Lachat *et al.*<sup>(32)</sup> found that only 5% of the meals available at a university canteen in Belgium complied with the optimal nutritional profile. In Australia, Burns *et al.*<sup>(33)</sup> have found that meals consumed outside the home can make a significant contribution to the fat content of the diet. Comparable findings are reported in another study of Danish worksite cafeterias, where Lassen *et al.*<sup>(23)</sup> evaluated the nutritional composition of worksite canteen lunches. In general, the meals served were too high in fat and too low in fruit and vegetables. On the contrary, Roos *et al.*<sup>(26)</sup> found that those having lunch at a staff canteen were more likely to follow the recommended food guidelines. In Finland, lunch is usually a cooked meal including bread and fresh vegetables within the price of the meal.

Even though the worksite canteens seem to be a promising setting for promoting healthy eating<sup>(26,34–36)</sup>, there is limited knowledge on how healthy eating can be promoted most effectively at the workplace. Taking into account that previous studies<sup>(23,32,33,37)</sup> have found that meals consumed outside the home can make a significant contribution to the fat content of the diet, it is important that the daily meals at the worksite canteen comply with minimum nutritional recommendations. Especially for caterers who supply meals for regular clientele such as workplace canteens, where the meal may constitute the main meal of the day, there is a special obligation to supply healthy options. Therefore, the Committee of Experts on Nutrition, Food and Consumer Health proposed, in 2008, to work on recommendations on promoting healthy eating habits at workplaces<sup>(38)</sup>.

Several study limitations should be noted. The present study is based on a self-administered questionnaire that could be subject to response bias. The response rate was 29%, but since the survey was a self-administered mailed questionnaire and no follow-up by phone or e-mail was done, the response rate seems reasonable. A similar low response rate, 30%, was reported in another canteen survey from Denmark<sup>(39)</sup> in 1995. The low response rates could possibly reflect the fact that canteens are not core businesses at the worksite, so the willingness to participate in surveys might be limited. The low response rate is a weakness but this is normally a challenge when studying organisations<sup>(14,15)</sup>. We have no data available on worksites belonging to either the private or public sector. Furthermore, we have no information on price strategies or on how many menu items are actually being sold, but only the availability of menu items. Also, we have no data on the actual nutritional quality of the meals served, and the questionnaire is not validated for sensitivity to discriminate between healthy and less-healthy meals.

The present study also has several strengths. The focus of the study is on the managers' description of the meals available in the canteens and on the characteristics of the worksite and its workforce. Very few studies have that focus and acknowledge that the food service environment and the food service managers are important environmental determinants for eating behaviour.

In conclusion, the present study, examining the availability of healthy meal options in Danish worksite canteens, shows that the canteens have room for improvement in order to promote healthier food choices, since only 12% of the canteens fulfilled all of the health criteria set up in this study. However, assessment of the consumer nutrition environment at worksite canteens is challenging because of the complexity in the range of food choices. Environments such as workplaces need to be aware of the significance of improving the nutritional level at worksite canteens and having healthy food choices easily available. Eating habits, however, correlate with educational and socio-economic conditions of the population and thus it is likely that the perspectives in promotion of healthy eating at worksites also depend on the type of worksite. The present study showed that the chances of having a healthy meal were significantly higher for an employee at a worksite with a majority of female workers or for an employee at a bigger worksite. Also, there seems to be a relationship between the financial support of the company and the availability of healthy meal options at the canteen.

The present study is a step towards evaluating and categorising worksite canteens according to the availability of healthy food choices. The food service environment and managers are important determinants for eating behaviour, and more research is needed to determine the role that variance in organisation environment plays for the potential of the worksite intervention to make a difference in promoting healthy eating.

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