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TITLE: What is the cost of a healthy diet? Using diet data from the UK Women's Cohort Study

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ABSTRACT:

Background:

A healthy diet is important to promote health and wellbeing whilst preventing chronic disease. However, the monetary cost of consuming such a diet can be a perceived barrier. This study will investigate the cost of consuming a range of dietary patterns.

Methods:

A cross sectional analysis, where cost of diet was assigned to dietary intakes recorded using a Food Frequency Questionnaire. A mean daily diet cost was calculated for seven data driven dietary patterns. These dietary patterns were given a healthiness score according to how well they comply with the UK Department of Health's Eatwell Plate guidelines. This study involved ~35000 women recruited in the 1990s into the UK Women's Cohort Study.

Results:

A significant positive association was observed between diet cost and healthiness of the diet (p for trend >0.001). The healthiest dietary pattern was double the price of the least healthy, £6.63/day and £3.29/day respectively. Dietary diversity, described by the patterns, was also shown to be associated with increased cost. Those with higher education and a professional or managerial occupation were more likely to consume a healthier diet.

Conclusions:

A healthy diet is more expensive to the consumer than a less healthy one. In order to promote health through diet and reduce potential inequalities in health, it seems sensible that healthier food choices should be made more accessible to all.

What is already known on this subject?

A healthy diet has been shown to be more expensive than a less healthy one, which may contribute to food choice. However, no UK studies have used a food cost database to estimate cost of dietary patterns derived from diet records.

What this study adds?

A healthy dietary pattern in UK women is more expensive than a less healthy one, estimated using a food cost database applied to individual level diet records using a food frequency questionnaire. The healthiest dietary pattern cost twice the price of the least healthy diet. This study has the potential to influence public health policy in that it highlights the need to promote healthy food choices which are accessible and affordable to all.

INTRODUCTION:

A healthy diet is important to promote health and wellbeing whilst preventing chronic disease. Diet is a well known modifiable risk factor for many chronic diseases such as obesity, cardiovascular disease and cancer [1]. However, consumption of a healthy diet can be challenging and gives rise to a number of questions. What constitutes a healthy diet? How do we measure a healthy diet? How much will it cost?

In order to answer these questions we need a robust indicator of a healthy diet. The presence of an individual food or nutrient in a diet provides little indication of whether that overall diet is healthy or not. Healthy eating guidelines may vary between developed countries but they tend to provide the same general message. In the UK, the Department of Health promote their dietary recommendations for optimum health using a pictorial illustration ‘The Eatwell Plate’ [2], encouraging an overall healthy diet, rather than consumption of specific foods.

Data driven dietary patterns, created using techniques like factor analysis or cluster analysis are useful to identify patterns which exist in the dietary data of a specific study population [3], however they do not necessarily offer an indicator of healthiness of a diet. Alternative methods measure healthfulness of diet according to predefined patterns, for example the Healthy Eating Index [4-7]. Combining dietary pattern methods with a healthy eating index could provide the best of both.

Diet choice may vary due to health, personal taste, income or cultural reasons, so while public health guidelines encourage consumption of a ‘healthy diet’, the choice and purchase of food is the responsibility of an individual or household. In the current economic climate, with rising unemployment and associated fall in income, combined with increased costs, people are making savings where they can. Food/grocery shopping is one of these places [8-10]. In the developed world the choice of food is wide and varied so where cheaper food alternatives are available it could influence food purchasing. The increase in market share of ‘discount’ food retailers in the UK highlights this demand for cheaper food [11].

In recent years there has been increased interest in how the price of food affects food consumed. The majority of this research shows that a healthy diet is a more expensive diet [12-15]. It has been suggested that the least healthy, nutrient poor diets are consumed by the less affluent [16] while those with more money can afford a more expensive diet including options which are recommended to promote health. Such studies have shown a stronger association between cost of diet and healthiness of diet exists in women, compared to men [13, 17, 18]. Measuring diet accurately in a population is challenging and subject to measurement error [19]. Assigning a cost to a diet is also complex. Commonly used methods are till receipt collection - as used by the Family Food Survey in the UK - [20] or assigning prices from a food cost database [16].

This study investigates the cost of dietary patterns, derived by cluster analysis, consumed in the large UK Women's Cohort Study (UKWCS). This cohort was established in order to explore diet-disease relationships, for which a large sample size was required. At that time other cohorts had focussed on men, so it seemed intuitive that this cohort target women. The dietary patterns reflect both quantity and diversity of food and have been assigned a healthiness score according to how well they adhere to the Department of Health's Eatwell Plate. Diet cost is assigned from a food cost database, which has been evaluated and deemed suitable for population research [21]. The main aim is to show whether there are any differences in cost between a healthy dietary pattern in UK women and a less healthy pattern.

METHODS:

Study Design and Sample

The UKWCS was set up in the 1990s to investigate associations between diet and health outcomes. At baseline, between 1995 and 1998, 35372 women were recruited into the cohort from a World Cancer Research Fund mailing list [22]. The aim of the cohort was to investigate the effect of diet on long term health in women, so the study was weighted such that there were a high proportion of vegetarians in order to better facilitate such analysis. The UKWCS was not designed to be geographically representative. However, there are large numbers of women from each region in England and Wales and Scotland, representing between 0.08% and 0.16% of total women in each region. The women were typically middle aged (mean age 52 years at baseline) and well educated (52% educated above A-level) so generalisable to these types of UK women. No weighting of the sample was used in this study.

These women all completed a 217 item validated food frequency questionnaire (FFQ), reporting food consumption over the previous 12 months, along with a more general lifestyle questionnaire. 1962 women were excluded from the sample due to incomplete FFQ data [23]. Individuals consuming <300 and >6000 kcal/day were also excluded from the analysis as these were considered to be outliers (n=73). This left a sample of 33337 for inclusion in this cross sectional analysis.

Ethics

Ethical approval was obtained from174 local ethics committees during 1994 and1995 [24].

Dietary patterns

Using the UKWCS baseline FFQ data, seven dietary patterns were identified by Greenwood et al (2000) using a k mean cluster analysis; 'Monotonous Low Quantity Omnivore', 'Health Conscious', 'Traditional Meat Chips and Pudding Eater', 'Conservative Omnivore', 'Higher

Diversity Traditional Omnivore', 'High Diversity Vegetarian' and 'Low Diversity Vegetarian' [25]. These patterns, described in Table 1, were named according to their food contents, frequency and quantity of consumption, rather than to reflect the healthiness of a particular pattern. In order to rank the patterns in order of their health promoting benefits, a score was developed, by comparing the dietary pattern contents to the UK Department of Health's Eatwell Plate [2]. To our knowledge, this is the first time this has been done.

Healthiness index

The healthiness index was based on a combination of the five segments of the Eatwell Plate guidance relating to food intake. In the US, the Healthy Eating Index is a measure of diet quality which assesses conformance with federal dietary guidance. This index is based on the UK Department of Health's Eatwell Plate which illustrates the UK specific dietary guidelines: to consume plenty of starchy products - potatoes, bread, rice and pasta, choosing wholegrains where possible to increase fibre intake; at least 5 portions of fruit and vegetables daily ("5 a day"); some high protein foods - meat, fish, eggs, beans or other non-dairy proteins; some milk and dairy; and only a small amount of saturated fat, sugar and salt. Using the contents and quantities of the UKWCS seven dietary patterns, a value (between negative one and plus two) was assigned for how well the dietary pattern achieved each of the five components of the Eatwell Plate.

- A value of negative one is assigned if the dietary pattern falls short of the Eatwell Plate guidance, producing a negative effect on diet quality e.g. not consuming any fruit and vegetables. This value may also be assigned if the pattern exceeds Eatwell Plate guidance such that it produces a negative effect on diet quality e.g. consuming too much saturated fat products.
- A value of one is assigned if the pattern goes someway to meeting the Eatwell Plate guidance e.g. some fruit and vegetables are consumed, but not in excess of 5 portions a day.
- A value of 1.5 is assigned if the pattern just meets the guideline, for example 5 portions of fruit and vegetables a day.
- A value of two is given if the pattern exceeds the Eatwell Plate guidance e.g. more than 5 portions of fruit and vegetables are consumed daily.

A half point value is used to reflect the fact that the difference between nearly meeting, meeting and exceeding recommendations is more subtle than the difference between not trying and nearly meeting recommendations.

The individual component value was then weighted according to the proportion of the Eatwell Plate which that food constituted, for example starchy foods constitute one third of the plate so the score for this component is multiplied by 33.3.

As the Eatwell Plate guidelines include a recommendation to choose wholegrain where possible when consuming starchy foods to increase fibre intake, we also incorporated fibre consumption into the score. The percentage of women in each pattern meeting dietary recommendations for fibre of 18g/day was summed with the Eatwell Plate values. See table 1. The index score was derived according to quantiles of the weighted Eatwell Plate values (<65, 66-130, 131-195, 196-260 and >261) ensuring that the lowest value was assigned an index score equal to one and the and highest equal to five.

Dietary pattern	High quantities	Moderate quantities	Low quantities	Eatwell weighted value	% of women meeting fibre recommendations (18 g/day)	Sum of Eatwell weighted value and % meeting fibre recommendations	Healthiness index score*	Healthiness explanation
Monotonous Low Quantity Omnivore	White bread, milk, sugar	Potatoes , meat	Most other foods	16.60	46	62.60	1	Nutrient poor diet promotes risk of obesity and related co-morbidities. Lacking in fruit and vegetables, with high amounts of sugar.
Traditional Meat, Chips and Pudding Eater†	White bread, chips, meat, sugar, high-fat and creamy food, biscuits, cakes	Most other foods	Wholemeal food, soya products, vegetables, salad, fruit	16.60	72	88.60	2	An energy dense and nutrient poor diet promotes risk of obesity and related co-morbidities. Whilst this is a more varied diet than the Monotonous Low Quantity Omnivore, there is a limited consumption of healthful foods and too much high fat and sugary foods to match the Eatwell Plate. This does not provide all nutrients for recommended intake.
Conservative Omnivore	No foods eaten in high quantity	Most food, including potatoes, meat, fish, eggs, fruit, vegetables	Cereals, chips, wholemeal food, nuts, pulses, spreads and dressings, chocolate, crisps, biscuits. Less red meat, less chips and less puddings than the Traditional Meat Chips and Pudding Eater and the Higher Diversity Traditional Omnivore.	100.00	78	178.00	3	While this dietary pattern does not consume large amounts of any foods, it does follow the Eatwell Plate guidelines with lesser quantities.
Low Diversity Vegetarian	Wholemeal bread, soya products, pulses, fruits (not exotic fruit), vegetables.	Cereals	Butter, eggs, meat, fish	75.00	87	162.00	3	With the exception of meat, fish and eggs this diet is close to the Eatwell Plate recommendations. It however does not meet the daily recommended nutrient intakes.
Higher Diversity Traditional Omnivore	Chips, white pasta and rice, high-fat and creamy food, eggs, meat, fish, chocolate, biscuits, crisps. More fish and salad and general diversity than the Traditional Meat Chips and Pudding Eater.	Vegetables, fruit and alcohol.	Less cakes and puddings than the Traditional Meat Chips and Pudding Eater.	133.30	97	230.30	4	This dietary pattern contains good dietary diversity and is close to the Eatwell Plate guidelines. Recommended intakes of nutrients are met. More fruit and vegetables and less high fat food should be consumed to further promote health.

High Diversity Vegetarian	Wholemeal bread, cereals, wholemeal pasta and rice, soya products, spreads, nuts, pulses, vegetables, fruit, herbal tea (generally higher consumption of these products that the Low Diversity Vegetarian).	-	White bread, meat, fish	141.60	99	240.60	4	With the exception of meat, fish and eggs this diet is meets the Eatwell Plate recommendations and daily nutrient intakes. The high fibre content is likely associated with reduced obesity, CVD and some cancers.
Health Conscious	Bran, potatoes, wholemeal food, yoghurt, low-fat dairy products, pulses, fish, vegetables, salad, fruit	Most other foods	Chips, sugar	166.60	99	265.60	5	Rich in fruit, vegetables and wholemeal food, pulses and fish providing a range of essential nutrients. High fibre containing diet which protects against cardiovascular disease. This type of diet is likely to prevent against certain cancers. This diet meets the Eatwell Plate requirements well.

Table 1 – Summary of the seven dietary patterns and their healthiness index score.

* Calculated from the Sum of Eatwell plate weighted value and % meeting fibre recommendations divided into 5 equal groups: 1= <65, 2= 66-130, 3=131-195, 4=196-260, 5=>261

† The most commonly consumed dietary pattern in the UKWCS, used as a reference category in regression analysis.

Cost of foods

The Nutritional Epidemiology Group at the University of Leeds have developed an in-house food cost database, based on the McCance and Widdowson food codes [26]. This database – the Diet And Nutrition Tool for Evaluation (DANTE) food cost database - has been evaluated and was shown to be effective for estimating diet cost at a population level [21].

Statistics

Stata IC12 statistical software [27] has been used to perform the analysis.

A post hoc sample size calculation was carried out which showed that based on the numbers consuming each dietary pattern in the UKWCS, there is 95% power to detect a £0.07 difference in daily diet cost at the 5% significance level between any two of the dietary patterns. Given that the mean daily diet cost for the UKWCS (in 1998/9) was £4.47 this study is powered to detect a difference of 2%.

One-way analysis of variance was performed to test for difference between the daily costs of consuming each dietary pattern. The Kruskal-Wallis test was used when the data was non-parametric. The relationship between diet cost and diet quality was examined using a test for trend and the relationship between diet pattern cost and demographic variables presented as descriptive statistics. To investigate how well dietary pattern consumption predicts the daily cost of diet, linear regression was used. The 'Traditional Meat Chips and Pudding Eater' dietary pattern was used as a reference group as this was the most commonly consumed dietary pattern in the UKWCS, with 18% of the women consuming this dietary pattern. Three models were created, with model variables determined using a causal diagram; unadjusted (model 1); adjusted for energy intake and physical activity (model 2) and adjusted for age, energy intake, physical activity, smoking, social class and education (model 3).

Metabolic Equivalent of Tasks (METs) were used as a measure of physical activity. Smoking is reported as a binary value which indicates if the woman was a current smoker. Total calorie intake is derived from the FFQ. BMI is calculated from self reported height and weight at baseline. Social class was recorded using employment status and coded according to the National Statistics Socioeconomic Classification (NS-SEC) of the women. 'Highest education level attained' was used as a measure of education.

RESULTS:

The dietary patterns and their corresponding healthiness index scores are summarised in table 1. The 'Monotonous Low Quantity Omnivore' pattern is the least healthy whilst the 'Health Conscious' pattern is the most healthy.

Significant differences were observed in demographic variables between dietary patterns (table 2). BMI varies significantly between dietary patterns, with the women consuming vegetarian dietary patterns having lowest BMI and those consuming a Traditional Meat Chips and Pudding Eater pattern the highest BMI. With an increasing diet healthiness score, increasing education, social class and physical activity are also observed. A significant positive trend ($p<0.001$ exists between dietary cost and dietary healthiness.

Dietary pattern	N	Mean daily diet cost in £ (SD)	Mean calorie intake (SD)	Mean Cost per calorie £ (SD)	Mean BMI (SD)	Median METS (IQR)	Age (SD)	% educated above A level	% with professional/ managerial occupation	Diet Healthiness Score (1=lowest and 5=highest)
Monotonous low quality omnivore	5331	3.29 (0.95)	1823 (555)	0.19 (0.5)	24.7 (4.9)	12 (13)	53.4 (9.9)	37.3	53.7	1
Traditional meat chips and pudding eater	5998	4.39 (1.01)	2476 (624)	0.18 (0.3)	25.1 (4.5)	14 (13)	52.1 (9.4)	43.9	55.8	2
Conservative omnivore	5860	4.14 (1.02)	1995 (489)	0.21 (0.4)	24.8 (4.3)	14 (12)	54.5 (9.1)	48.7	61.9	3
Low diversity vegetarian	5071	3.93 (1.00)	2183 (578)	0.18 (0.4)	23.4 (3.7)	13 (12)	49.0 (8.6)	62.5	69.0	3
Higher diversity traditional omnivore	4733	5.50 (1.21)	2892 (672)	0.19 (0.3)	24.9 (4.5)	16 (14)	53.0 (9.1)	54.5	64.2	4
High diversity vegetarian	4273	5.01 (1.23)	2637 (676)	0.19 (0.3)	23.2 (3.7)	16 (13)	49.7 (8.6)	68.6	75.2	4
Health conscious	2071	6.63 (1.95)	2809 (797)	0.24 (0.5)	24.3 (4.2)	17 (15)	52.7 (9.0)	57.7	71.5	5
Chi2: p value	-	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	-
All cohort	33337	4.47 (1.44)	2343 (717)	0.19 (0.4)	24.4 (4.4)	14	52.1 (9.3)	52.3	63.2	-

Table 2 - Summary statistics for dietary patterns observed in the UKWCS (energy intake <300 and >6000 kcal/day excluded**)**

Results show that the most expensive diet is the ‘Health Conscious’ dietary pattern and the least expensive diet is the ‘Monotonous Low Quantity Omnivore’ dietary pattern. The results also show that diversity in a diet, as described by the dietary patterns, comes at a cost, with the more diverse dietary patterns being more expensive (table 2). The range of diet cost across the seven dietary patterns is £3.29/day to £6.63/day, with a mean difference of £3.35 (CI £3.29 to £3.41). This difference is statistically significant ($p<0.001$).

There were highly significant differences in diet cost between dietary patterns (table 3). In the unadjusted regression model all results were highly significant suggesting that the daily diet cost may predict dietary pattern consumption. The ‘Monotonous Low Quantity Omnivore’ dietary pattern costs 25% (£1.10) less per day than the reference ‘Traditional Meat Chips and Pudding Eater’ pattern, whilst the ‘Health Conscious’ dietary pattern is most expensive being 51% (£2.24) per day more than the reference category.

The unadjusted regression model explains 37% of variation (R^2 0.37) indicating that cost of food contributes to diet choice (model 1). Adding total calorie intake, physical activity and age to the predictor variables in the model increases the R^2 to 0.69, with energy intake contributing most to this increase (model 2). Inclusion of these variables attenuates the regression coefficients showing that the ‘Monotonous Low Quantity Omnivore’ dietary pattern is still the cheapest, being 6% (£0.25) less per day than the reference ‘Traditional Meat Chips and Pudding Eater’ whilst the ‘Health Conscious’ pattern remains the most expensive being 41% (£1.80) per day more expensive. The mean difference between the least healthy and most healthy diet is decreased to £2.06 (CI £2.01 to £2.10) per day, which is still highly statistically significant ($p<0.001$). With such a large sample size, the p value is likely to be significant. However, this is a reliable estimate and an important difference in cost. An interesting effect is observed in relation to the ‘Conservative Omnivore’ dietary pattern where the direction of effect is swapped between the two regression models. In the adjusted model this pattern is in fact more expensive by 9% (£0.39) per day than the reference group, where in the unadjusted model it was 6% (£0.25) per day cheaper.

When socioeconomic status, education and smoking status are also added to the model, very little difference in the coefficients is observed (model 3).

Dietary Pattern	Unadjusted model (1) (R^2=0.37)		Model (2) adjusted for age, energy intake and physical activity (R^2=0.69)		Model (3) adjusted for age, energy intake, physical activity, smoking, social class and education (R^2=0.70)	
	Daily diet cost £ (CI)	P value	Daily diet cost £ (CI)	P value	Daily diet cost £ (CI)	P value
Monotonous Low Quantity Omnivore	-1.10 (-1.15 to -1.06)	<0.001	-0.24 (-0.027 to -0.21)	<0.001	-0.25 (-0.28 to -0.22)	<0.001
Traditional Meat Chips and Pudding Eater			Reference			
Conservative Omnivore	-0.24 (-0.28 to -0.20)	<0.001	0.39 (0.36 to 0.42)	<0.001	0.39 (0.36 to 0.43)	<0.001
Low Diversity Vegetarian	-0.46 (-0.51 to -0.42)	<0.001	-0.06 (-0.09 to -0.03)	<0.001	-0.05 (-0.08 to -0.02)	0.002
Higher Diversity Traditional Omnivore	1.11 (1.07 to 1.16)	<0.001	0.55 (0.52 to 0.58)	<0.001	0.57 (0.54 to 0.61)	<0.001
High Diversity Vegetarian	0.62 (0.57 to 0.66)	<0.001	0.41 (0.38 to 0.45)	<0.001	0.43 (0.40 to 0.47)	<0.001
Health Conscious	2.24 (2.19 to 2.30)	<0.001	1.80 (1.76 to 1.84)	<0.001	1.81 (1.77 to 1.85)	<0.001

Table 3 – Regression model investigating the influence of dietary pattern consumption on daily diet cost compared to the reference: Traditional Meat Chips and Pudding Eater, which is the most commonly consumed dietary pattern in the UKWCS.

DISCUSSION:

This research is the first to assign costs to dietary pattern data in the UK. The strong positive association observed between the diet cost and diet healthiness is consistent with other studies [28-31]. Results show that those who have a higher socioeconomic status, indicated by both education and occupation, are also more likely to consume a healthier and more expensive diet. The association between demographic characteristics: age, education and occupation and the cost of diet are clear despite the homogeneity of the women in this cohort. They are typically middle aged and well educated (as reported in table 2). Healthier, more expensive diets and higher socioeconomic status markers also appear to be associated with increased physical activity levels, illustrated by highest median METS values for these women. It might be hypothesised that the increase in diet cost is therefore due to increase in total energy intake to balance increased energy expenditure through physical activity. Controlling for these factors in regression analysis attenuates the difference, however, a significantly higher cost of a healthier diet remains.

The dietary patterns in this study have been characterised according to both health promoting contents of the diet and the diversity of the diet, both of which contribute to a healthy diet [4]. Our results suggest that both of these factors come at a financial cost. Another study has also observed that cost increases with diversity [16]. The dietary patterns in this study also include an aspect of quantity of the food consumed, as well as variety, defined by the number of different food types consumed in each pattern, something which has previously been omitted when considering diversity in diet [32].

An interesting effect was observed relating to the 'Conservative Omnivore' dietary pattern where it becomes more expensive in relation to the 'Traditional Meat Chips and Pudding Eater' in the adjusted regression analysis, compared to being cheaper in the unadjusted analysis. This pattern is high in variety, but foods are consumed in low quantities. One explanation for this change in the direction of the effect could be that by controlling for energy intake the effect of the diversity becomes clearer; supporting the finding that diversity comes at a cost.

As with all studies involving dietary assessments there are limitations. Food frequency questionnaires have been shown to overestimate food intakes in the UKWCS [23] but overestimation is likely to occur for all foods thus the ranking of the cost of dietary patterns would be unaffected. On the other hand, social desirability bias may lead to overestimation of healthier food items and underestimation of less healthy. This could have resulted in exaggeration of the differences between patterns. Dietary assessment by FFQ while cheap and convenient is not the gold standard. Repeated 24 hour recall or weighed food diary would provide more reliable dietary data. However, these methods are challenging to deliver to large cohort studies such as the UKWCS. It may be possible in further work to investigate whether the same is observed with cost of the foods assigned to weighed or recalled intake records. Whilst the FFQ does take into account food which has been eaten outside of the home, it does not differentiate in terms of the price difference of consuming food at home compared to in a restaurant. Average prices assigned do not account for regional, supermarket or brand variation in costs. As large savings can be made by purchasing cheaper, generic brands

[33], it may be expected brand purchasing would vary by socioeconomic status, so use of average prices may have attenuated differences in cost of dietary patterns.

Given that the DANTE cost estimates are for an individual's food consumption, estimated using costs of 3000 different foods, it could be argued to be more accurate than alternative methods derived from collecting household expenditure data, which do not reflect individual food consumption. The DANTE diet cost database was evaluated using a comparison of diet cost from till receipt collection and from a four day food diary with costs assigned by the database showing that at a population level, the difference was as little as £0.02, which is less than 1% of the mean daily diet cost [21]. The costs in this study are also assigned at an individual level and averaged for the dietary patterns further increasing reliability of the dietary pattern costs.

The UKWCS only includes women aged 35-69 at recruitment, thus limiting the generalisabilty of these findings. However, due to the large numbers in this study, the results are transferrable to such women throughout the UK. The large sample size is a strength, and the effect sizes described represent relatively large, and statistically significant differences between dietary patterns.

Due to the phased rollout of recruitment in the UKWCS and the FFQ assessment method recording frequency of consumption in the last 12 month, the problem of seasonal variation is avoided. Dietary patterns identified in this cohort, using a cluster analysis are derived from what the women actually ate, rather than trying to make their dietary consumption fit a predefined dietary pattern. So while the results are not directly comparable to other dietary pattern research they do reflect true dietary pattern consumption in this population.

The dietary data was collected between 1995 and 1998 in order to examine the relationship between diet and health. This study uses the cost of food from the time at which the data was collected. The food costs were not inflated to bring in line with today's prices. If the food group costs had changed at different rates it may have affected food choice, potentially altering dietary patterns; in which case it would have been incorrect to adjust for inflation to today's prices. Results are presented as a percentage of the mean diet cost to illustrate the proportion of difference, which would be comparable regardless of total cost. Further work will look at how the cost of the dietary pattern is related to the long term health of these women. The cost of these dietary patterns adds strong evidence supporting what is already known about the cost of a healthy diet.

No other study has been able to assigns costs from a cost database - which has been evaluated for use in population studies - to dietary data for such a large sample of women in the UK.

To conclude, a healthy dietary pattern is more expensive to the consumer than a less healthy one and those who consume a healthier dietary pattern are more likely to be better educated and in a better paid profession. This study adds UK specific data supporting the findings in the literature from elsewhere. The study has the potential to influence public health policy in that it highlights the need to promote healthy food choices which are accessible and affordable to all.

Licence for Publication

Competing Interest

Competing Interest: None declared

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