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The diet of prisoners in England

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Abstract

Purpose – The purpose of this research is to establish whether the meals provided by the prison service enable prisoners to follow government guidelines on nutrition and healthy eating, and the extent to which they do so.

Design/methodology/approach – A total of eight prisons, four male (category A, B and C), two female and two young offenders' institutes were randomly identified and visited. Data collection involved taking three days of cyclical menus, the institution's recipes and methods and standard or average portion sizes to calculate the mean nutrient composition of standard, healthy, vegetarian/vegan and Halal menus. Menus were also analysed to establish how well they conformed to the "Balance of Good Health".

Findings – Results show that, with the exception of some nutrients, prisoners have access to and are able to choose a nutritionally balanced diet and in the main do so. All prisons have attempted to make available menus that conform to the Balance of Good Health model; however, in some cases, choice is hampered, primarily because menus have not been annotated accurately; some dishes are not always as healthy as they might or could be; and prisoners in most cases do not actually understand what constitutes a healthy balanced diet.

Originality/value – There is a paucity of data on prison food service and as such this original work adds to the body of knowledge in the field.

Keywords Food service, Prisons, Diet, England

Paper type Research paper

Introduction

Providing the opportunity to choose a healthy, nutritionally balanced diet is important in all catering operations. Equally as important, is equipping consumers with adequate knowledge so that they are able to make an informed choice. In addition, where the food and meals provided are the sole or primary source of sustenance, for example, in boarding schools, older peoples' homes, hospitals and prisons, the ability to choose and consume a healthy, balanced diet assumes an even greater importance; particularly over extended periods of time.

Prison food service

Prisons, along with many similar food service operations, are required to provide an appealing, appetising and nutritionally balanced diet within very tight budgetary constraints. This is achieved in prisons by using a cyclical menu that offers a planned, varied diet, working within a budget ranging from £1.20 in an open prison to £3.41 in a

This research forms part of a wider project undertaken on behalf of the National Audit Office (NAO) to whom we are grateful for their permission to publish. It should be noted that the views and opinions expressed here are those of the authors and in no way reflect those of the NAO or HM Prison Service.



Young Offenders Institute (National Audit Office, 2006). In practice, the daily food allowance is in the order of £1.87 per person per day.

Policy and standards for prison food service are set out in the *Prison Service Catering Manual* (Prison Service Order, 1999), and in the main, prisoners choose their meals between three and five days in advance using what the prison service calls a “pre-select menu”. This was introduced in the late 1990s and enables prisoners to choose their main course component (entrée) and dessert from a daily menu offering around five choices, including a “normal” and “healthy” option and where appropriate, vegetarian, vegan and Halal alternatives. Menus are also available to cater for other religions although none were encountered during the course of this research. All prison meals follow a similar format, which consists of breakfast, usually provided as a pack, which includes items such as a breakfast cereal, milk (UHT), bread, spread and conserve, tea bag, and a sachet of whitener and sugar. The midday and evening meals generally have a similar selection and include a choice of approximately five entrées, potatoes and vegetables. A lighter dish and roll/sandwich are also available. An example of a daily pre-select menu is given in Figure 1.

Depending on the nature of the establishment, prisoners either go to a central dining room for their meals, or meals are transported to the prison wing. In the former case, meals tend to be eaten in a cafeteria-style dining room, and in the latter case, either at tables in the centre of the wing, but as is more usual, in prison cells. When collecting food from the hotplate/service area, a prison warder calls the name of the entrée and dessert chosen by each prisoner, which invariably, is strictly portion controlled, and served by a fellow inmate. Potatoes, vegetables and bread tend not to be so rigidly monitored.

Nutrition and healthy eating

Nutrition and healthy eating standards are also set out in the *Prison Service Catering Manual* (Prison Service Order, 1999). However, what might be a healthy food to one person may not necessarily be a healthy food to another, hence, what is important from a foodservice perspective, is not healthy or unhealthy foods but the balance and variety within the diet and what is offered on a menu. This manifests itself in a prison in that the total diet provided, daily or over a short period of time, for example three days, should contain a combination of foods and nutrients, based on current recommendations. It is also equally as important to ensure that individuals have adequate knowledge and understanding to help make such a choice.

Prison food service in context

Prisoners are a diverse and complicated group whose general health is not as good as the average population (De Viggiani *et al.*, 2005) with poorer physical, mental and social health, and lower nutritional status (Smith, 2002). Most prisoners, especially long term, rely heavily on the food provided by the institution, which is responsible for providing a nutritionally balanced and healthy diet. The prison service can only, however, be expected to provide such a diet, ultimately it is an individual’s choice that determines intake (Eves and Gesch, 2003).

It is crucial to understand and appreciate the attitudes and opinions of this group towards the concept of healthy eating, as food habits are part of an individual’s identity, “inner being” and culture (Booth, 1987). In addition, within a prison

Main Menu Week 1

Day	Breakfast	Lunch	Tea	Comments
Thursday 28/04/05	Breakfast pack Milk (semi-skim) Bread Roll	Bread and Soup		
		1 Vegetarian Pasta Bake Boiled Potato and Mixed Vegetables	A Vegetable Supreme Mashed Potato Green Beans	
		2 Chicken and Mushroom Pie Boiled Potato and Mixed Vegetables	B Chicken Supreme Mashed Potato Green Beans	
		3 Halal Jamaican Beef Patti Boiled Potato and Mixed Vegetables	C Halal Chicken Curry Boiled Rice Green Beans	
		4 Corned Beef and Pickle Roll Crisps	D Grilled Gammon Mashed Potato Green Beans	
		5 Jacket Potato and Coleslaw	E Pork Pie Salad	
			X Eves Pudding	
			Y Fresh Fruit	
Friday 29/04/05	Breakfast pack Milk (semi-skim) Bread Roll	Bread and Soup		
		1 Vegetarian Spring Roll Chips and Peas	A Bean and Vegetable Curry Boiled Rice Cauliflower	
		2 Breaded Fish Chips and Peas	B Chicken Chasseur Boiled Rice Cauliflower	
		3 Cheese and Beano Grill Chips and Peas	C Halal Beef Casserole Boiled Rice Cauliflower	
		4 Cheese and Tomato Roll Crisps	D Fish in Parsley Sauce Boiled Rice Cauliflower	
		5 Jacket Potato and Tuna	E Vegetable Quiche Salad	
			X Sponge Pudding and Custard	
			Y Fresh Fruit	
			Z	
Saturday 30/04/05	Breakfast pack Milk (semi-skim) Bread Roll	Bread		
		1 Veg Sausage x 2 Fried Egg Hash Brown x 2	A Soya Lasagne Garlic Bread and Salad	
		2 Chicken Sausage x 1 Bacon x 1 Hash Brown x 2 Fried Egg	B Minced Beef Lasagne Garlic Bread and Salad	
		3 Halal Chicken Sausage x 2 Hash Brown x 2 Fried Egg	C Halal Beef Italiane Garlic Bread and Salad	
		1,2 & 3 served with Tinned Tomato and Toast	D Rice and Bean Stuffed Peppers Salad	
			E Cheese Salad	
		4 Turkey Salad Roll Crisps	X Sultana Scone	
		5 Jacket Potato and Curried Beans	Y Fresh Fruit	
			Z	
<p>NOTES</p> <p>Vegetarian Cottage Pie made here as bought in product is not Vegan friendly</p> <p>Jacket Potato is served with its filling only</p> <p>Crisps go with Lunchtime Rolls only</p> <p>Soya Lasagne keep portions back for Vegans and top with Tomato Sauce instead of Cheese Sauce</p> <p>Garlic Bread not suitable for Vegans</p> <p>Vegetable Supreme to be made with Soya Milk and Vegan Margarine</p> <hr/> <p>Vegans to be given a portion of Mushrooms in place of Fried Egg on Saturday</p>				

Figure 1.
Example of a pre-select
prison menu

population, food is often regarded as “currency”, used to bully, seen as a bonus and as a way to assert independence, therefore, an appreciation of the complex nature of food choice in this environment is essential.

Although food consumption in a prison setting might be considered to be similar to other institutional food service provision, such as hospitals, it must be accepted that

the nature of the individual is somewhat different. Food plays a major role within the day of both scenarios, relieving the boredom and monotony of a routine existence; however, the psychological profile of prisoners is such that it is not advisable to overtly manipulate a situation that will alienate their good will as food can be a catalyst for aggression and an ill-designed menu, inadequate portion sizes, lack of variety or poorly cooked food can contribute to serious complaints and dissension (Blades, 2001).

The purpose of this research, therefore, was to establish whether the meals provided by the prison service enabled prisoners to follow government guidelines on nutrition and healthy eating and the extent to which they do.

Methods

Selection of prisons

Four closed male prisons, (category A, B and C × 2), two closed female and two young offenders' institutes (YOI) were randomly identified and a geographical check made to ensure all regions of the country were represented and that one privately operated (contract) prison had also been included. Contact was then made with the prison and visits arranged.

Methodology

Similar procedures were adopted for each visit with researchers arriving at the prison where the rationale and purpose of the visit was explained. The opportunity was also taken to become familiar with the layout, operating practices and procedures in use, begin the data collection and observe the service of the evening meal. Researchers returned the following day, to observe the preparation, despatch and service of breakfast, where offered at the servery, and to begin the main part of the data collection. Data collection then took place throughout the day, with midday and evening meals being observed.

Nutritional analysis of menus

The nutritional content of the menus was calculated from the various menus, recipes and portion sizes over three consecutive days; the two days of the visit, and either the day before arrival or the day after departure. This gave the greatest opportunity to observe and collect data as the dishes were made. The dishes chosen for analysis were the most popular on each day, as identified from the pre-select menu consolidation sheets. Where "packs" are used, for example, a beverage pack, nutritional values were calculated and included as daily amounts.

However, whilst all prisons used cyclical menus, few had comprehensive recipe manuals hence, many of the composite dishes varied each time they were made depending on the chef and what leftover items could be incorporated into that dish. Whilst the latter is standard kitchen practice, and makes sensible use of leftover items and ingredients, the lack of standard recipes alters the nutritional profile of the dish. To ascertain composition, researchers observed and spoke with each chef making the dish to get a broad idea of the amounts used. Where bought-in, pre-portioned dishes were used, details of these dishes and their weights were collected and used in the analysis.

Throughout, ingredients and finished items were weighed to obtain a "standard" dish composition. Although standard portions are generally specified, for example, vegetables – one scoop, mean portion sizes were also measured just prior to the start of

meal service by asking the prisoner responsible for the service of that food, to serve the item approximately six times using the appropriate ladle or utensil. These were weighed and a mean portion calculated.

Once the data had been collected, these were entered in a computer program “Microdiet” (2006), which includes in its database, standard food tables with appropriate supplements (Holland *et al.*, 1991; FSA, 2002), and the nutrient content of meals was calculated as follows:

- *Standard menus* – calculated using the mean of three days, standard portion sizes and the most popular items selected.
- *Special menus* – for each special menu, dishes were selected from the annotated menu, and calculated in a similar way.

These results were then compared with current recommendations (DoH, 1991): nutrient intakes – estimated average requirements (EAR), recommended nutrient intakes (RNI) and the percentages of energy derived from macronutrients, for the appropriate age-gender groups.

Balance of good health

All prisons used a cyclical menu varying in length from 14 to 28 days. The “Balance of Good Health” model (FSA, 2001) makes recommendations around either one or seven days, but it was considered important, from a food service perspective, that the cyclical menus were evaluated using the complete cycle, i.e. the menu cycle used by each prison.

Observation

During the visits, time was spent observing practices, primarily in the kitchen but also in the service of food where notes were made from these observations.

Unstructured interviews

A research protocol, informed from a review of the relevant literature and past studies was developed, with the main issues around prisoner understanding of healthy eating being explored. Interviews were conducted during each visit with prison officers ($n = 3-4$), uniformed and civilian catering staff and prisoners working in the kitchen (all of those on duty), other prisoners in the wing ($n = 8-10$) and gymnasium staff ($n = 2$). Sampling of prisoners was purposive, that is directed with interviews taking place primarily on an opportune basis in locations where individuals were encountered. In some prisons, this consisted of sitting down with prisoners whilst they consumed their meals but where this was not feasible, prisoners were spoken with whilst they waited in the queue for their meal. None of the interviews was recorded although extensive notes were made both during and immediately afterwards to enable the data to be collated and analysed. Data were analysed by taking the key themes around healthy eating and food choice.

Results and preliminary discussion

Methodological issues

Sample size and selection. The sample of prisons and prisoners is important if the results are to be representative and in previous prison research (Edwards *et al.*, 2001)

the sample was selected by the prison service drawing comment during the peer review process. Care was, therefore, taken to ensure that the prison sample was randomly identified and within the prisons, the wings were selected arbitrarily or chosen purposefully, for example, long-term prisoners. During the data collection, it became apparent that although small differences existed within prisons, many of the underlying themes were common leading to a conclusion that the sample size was adequate.

Data collection. Numerous techniques are available to measure and collect nutritional data (Gibson, 1990; Dietary Assessment, 2005): however, no single technique is suitable for every occasion hence the choice involves a trade off between the accuracy of results required, resources available, and the subjects being surveyed. Consequently, there remain a number of limitations in the methodology used in this particular study, which must be recognised when interpreting the results:

- *Data accuracy.* Whilst every effort was made to achieve complete accuracy, there may inevitably be some discrepancies as standard recipes and portion sizes did not always exist.
- *Number of days and day of the week effect.* The mean nutritional composition of menus was calculated over three consecutive days although estimates of the “ideal” number of days needed, is far from conclusive. Stuff *et al.* (1983) found no significant differences in results obtained from records maintained over one, three, and seven days, whilst others (Pearson *et al.*, 1982; Browne and Moloney, 1998) consider three days adequate in similar situations. Similarly, data collection took place on weekdays and did not include a weekend. However, as prisons work on a cyclical menu with little variation at weekends, it was considered that three days would be representative of the prison.
- *Season of the year.* Menus vary according to season with “summer” menus being used for this study.
- *The Hawthorne effect* (Handy, 1993). Workers who are the focus of attention can change their normal working patterns and it is possible that kitchen practices may have altered during the data collection although this was only apparent on one visit. Menu comparisons between what was planned and what was actually offered indicate that only small variations occurred, consistent with standard kitchen practice.
- *Nutritional analysis of dietary data.* Analysis of the data was undertaken using Microdiet and limitations can arise when using food tables. Where dishes are bought in ready-made, manufacturers’ data are not always available, and where it is, it often only includes the major nutrients. Furthermore, dish composition is often changed. As a result, “near equivalents” i.e. dishes of a similar type and composition, were selected from the standard food tables. In addition, the majority of values assume that food is served almost immediately after preparation and cooking but, as observed, this is not always the case and there is the potential for nutritional deterioration due to the time lag between production and consumption.
- *Privately purchased food.* No account was taken of food purchased privately by prisoners as the focus for this research was on the food provided by the catering operation. Similarly, plate waste was not measured, therefore selection might not

indicate consumption. Plate wastage in previous research (Edwards *et al.*, 1998) showed that in two prisons where it was measured, this was relatively low ranging from 4 per cent to 8 per cent.

The technique selected therefore measured what was available and the most popular choice for each menu rather than what was actually chosen and consumed by individual prisoners. Notwithstanding, there is a worldwide paucity of information on prisoners' diets partly because of the difficulties in gaining access, partly because of ethical considerations but primarily the ability to gain the cooperation of subjects. Similar techniques to those used in this study have been used in other prison studies (Eves and Gesch, 2003) and are considered sufficiently robust to provide usable results.

Nutritional content of menus

A nutritional breakdown of the various menus along with current recommendations, are given in Table I for the four male prisons, in Table II for the two female prisons and in Table III for the two YOI prisons.

In general, the menus provided by the prison service had a nutrient content close to current recommendations (DoH, 1991) and mirrored the guidelines given in the *Prison Service Catering Manual* (Prison Service Order, 1999) although there were some exceptions.

Energy

In the male prisons, the standard, vegan and Halal options slightly exceeded the recommendations whilst the healthy and vegetarian options were marginally under. In the female prisons energy availability was in excess of the recommendations for all menus. In the standard menu this was 55 per cent, primarily because of the large number of fried potato dishes served – at least eight times per week. In the YOIs energy intake was slightly in excess for all menus.

Percentage contributions to energy

The mean percentages of energy provided from protein, total and saturated fat and carbohydrate for the four male prisons are given in Table IV, in Table V for the two female prisons and in Table VI for the two YOI prisons.

The percentages of energy provided from total fat are broadly in line with the recommendations, but with the exception of the female prisons where the standard and vegetarian options are in excess, due, as already noted, to the high number of fried potato dishes.

In both the male and female prisons, all menus are within the recommendations for the amount of energy provided by saturated fat but on the contrary, in the YOI prisons, all menus are in excess.

In all prisons, the main food contributors to fat provision were chips and other fried potatoes, manufactured, bought-in foods such as pies, and spread. Interestingly, where vegan packs are offered, peanut butter is instrumental in increasing both the fat and salt content of the menu. Even so, the figures for male prisons compare favourably with the male population in the UK population where 35.8 per cent energy is obtained from fat and 34.9 per cent for the female population (Hoare *et al.*, 2004).

Nutrient	Unit	Standard diet		Healthy diet		Vegetarian diet		Vegan diet		Halal diet		Recommendations ^e		Previous study ^f	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Energy	kcal	3,042	87	2,529	287	2,528	166	2,841	277	2,734	86	2,550 ^a	2,566	264	1.10
	MJ	12.80	0.37	10.63	1.12	10.66	0.70	11.96	1.15	11.53	0.36	10.6 ^a	10.79	13.3	1.10
Protein	g	104.6	7.4	73.0	14.6	69.9	12.1	74.7	13.5	86.0	7.0	55.5 ^b	87.9	13.3	1.10
Total fat	g	119.2	3.2	88.1	21.4	85.6	9.0	102.8	21.1	98.1	7.4	102.2	102.2	17.2	1.10
Carbohydrate	g	413.9	18.2	385.9	35.1	395.0	22.4	430.9	19.6	402.9	11.2	345.4	345.4	42.6	1.10
Fibre	g	38.1	1.0	40.5	6.4	39.0	0.7	45.5	1.7	36.1	4.1	30	29.8	5.4	1.10
Fibre (Englyst)	g	8.4	2.3	8.0	0.7	9.0	2.2	12.7	1.5	8.0	3.5	18	18.5	2.4	1.10
Vitamins:															
A Retinol	equation	1,381	828	1,596	695	1,863	1,384	2,154	1,514	1,685	758	700 ^b	2,022	1,766	1.10
B ₁ Thiamin	mg	2.3	0.3	2.2	0.3	2.2	0.3	2.7	0.8	2.4	0.7	1.0 ^b	2.0	0.4	1.10
B ₂ Riboflavin	mg	2.4	0.4	2.3	0.3	2.1	0.2	2.9	1.6	2.3	0.4	1.3 ^b	2.0	0.4	1.10
Niacin	mg	33.3	2.5	23.8	3.6	22.1	2.2	35.7	14.0	27.3	4.0	17 ^b	—	—	1.10
B ₆ Pyridoxine	mg	2.9	0.3	2.4	0.2	2.5	0.0	2.9	0.3	2.5	0.3	1.4 ^b	2.5	0.7	1.10
B ₁₂	mcg	4.3	1.5	2.5	1.4	1.6	0.8	0.8	0.4	3.0	1.1	1.5 ^b	—	—	1.10
Folate	mcg	338	58	405	66	377	35	541	100	334	102	200 ^b	—	—	1.10
C Ascorbic Acid	mg	93.3	13.8	151.3	60.8	131.1	30.3	159.2	60.4	96.5	22.9	40 ^b	64.9	23.4	1.10
D Calciferol	mcg	2.7	1.5	1.5	1.1	1.0	0.7	1.1	0.3	2.1	0.9	10 ^d	4.1	2.0	1.10
E Tocopherol	mg	4.4	2.0	5.2	1.9	3.4	1.3	4.0	1.3	4.5	0.9	>4 ^c	9.3	4.3	1.10
Minerals:															
Ca Calcium	mg	938	52	962	168	1,012	339	682	105	979	190	700 ^b	915	166	1.10
Na Sodium	mg	4,534	847	2,872	1,768	3,708	737	4,344	408	3,879	440	1,600 ^b	4,106	588	1.10
Fe Iron	mg	21.7	4.3	19.8	3.9	19.3	4.0	23.0	4.4	20.6	5.9	8.7 ^b	16.1	2.1	1.10
Zn Zinc	mg	11.5	0.8	8.1	1.2	7.8	0.8	8.5	1.8	9.2	1.3	9.5 ^b	—	—	1.10
Se Selenium	mcg	39	21	16	10	18	10	12	4	25	18	75 ^b	—	—	1.10
Mn	mg	1.3	0.2	1.1	0.2	1.4	0.3	2.3	0.6	1.2	0.5	1.4 ^c	—	—	1.10
Manganese	mcg	93	38	63	36	53	12	25	9	67	24	140 ^b	—	—	1.10
I Iodine	mcg	93	38	63	36	53	12	25	9	67	24	140 ^b	—	—	1.10

Notes: ^a Estimated average requirements (EAR); ^b Reference nutrient intakes (RNI); ^c Safe intakes; ^d RNI for those confined indoors and > 65 years of age; ^e Males 19-50 years, DoH (1991); ^f Edwards *et al.* (2001)

Table I.
Mean nutrient provision
– four male prisons

Table II.
Mean nutrient provision
– two female prisons

Nutrient	Unit	Standard diet		Healthy diet		Vegetarian diet		Halal diet		Recommendations ^a
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Energy	kcal	3,007	471	2,147	130	2,862	186.0	2,927	458	1,940
	MJ	12.64	1.96	9.06	0.56	12.04	0.77	12.33	1.91	8.1
Protein	g	98.1	5.2	70.5	6.3	73.5	10.3	92.2	23.6	45
Total fat	g	130.9	30.1	70.3	4.4	117.7	17.2	113.9	30.5	
Carbohydrate	g	385.5	44.8	331.1	35.6	403.2	2.8	411.6	20.9	
Fibre (Southgate)	g	30.6	10.5	28.2	5.1	32.1	6.4	32.6	7.4	30
Fibre (Englyst)	g	5.7	0.3	6.7	0.8	8.9	0.6	6.4	0.7	18
<i>Vitamins:</i>										
A Retinol equivalent	mcg	666	129	736	31	757	87	770	212	600
B ₁ Thiamin	mg	2.6	0.1	5.2	4.9	2.7	1.3	2.0	0.3	0.8
B ₂ Riboflavin	mg	2.2	0.1	2.1	0.0	2.3	0.1	2.3	0.1	1.1
Niacin	mg	32.7	0.8	21.1	1.2	23.5	4.9	28.5	8.9	13
B ₆ Pyridoxine	mg	2.9	0.1	1.9	0.9	2.5	0.1	2.7	0.3	1.2
B ₁₂	mcg	2.8	0.1	3.5	0.1	1.9	0.8	2.4	0.6	1.5
Folate	mcg	299	45	328	76	366	36	333	80	200
C Ascorbic Acid	mg	72.3	27.8	86.2	1.5	101.2	4.2	109.9	7.4	40
D Calciferol	mcg	2.3	1.8	2.9	1.5	2.2	1.4	2.3	1.8	10
E Tocopherol	mg	1.5	1.4	2.9	1.1	2.4	1.2	2.3	0.8	>3
<i>Minerals:</i>										
Ca Calcium	mg	907	93	812	200	946	105	985	32	700
Na Sodium	mg	4,208	268	3,144	45	3,834	108	4,079	384	1,600
Fe Iron	mg	16.4	0.2	14.8	1.9	18.7	0.8	17.6	0.4	14.8
Zn Zinc	mg	8.9	0.8	7.3	0.3	7.8	1.1	10.2	3.2	7
Se Selenium	mcg	23	6	26	16	14	1	19	1	60
Mn Manganese	mg	1.0	0.1	0.9	0.2	1.4	0.5	0.9	0.1	1.4
I Iodine	mcg	57	8	63	9	52	4	63	12	140

Note: ^aFemales 19-50 years. DoH (1991)

Nutrient	Unit	Standard diet		Healthy diet		Vegetarian diet		Halal diet		Recommendations ^a		Previous studies ^b	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	1996	1997
Energy	kcal	3,115	561	2,885	177	2,873	293	3,045	72	2,755	—	—	—
	MJ	13.13	2.53	12.17	0.76	12.11	1.24	12.82	0.30	11.51	—	12.9	9.7
Protein	g	98.4	5.4	85.2	11.5	78.5	3.0	96.5	8.3	55.2	—	90.0	76.8
Total fat	g	108.3	32.2	90.7	6.0	100.9	12.3	108.1	2.3	—	—	127	127
Carbohydrate	g	465.6	78.8	460.8	46.1	440.5	52.6	450.2	35.0	—	—	—	—
Fibre (Southgate)	g	31.8	5.1	32.1	6.1	32.5	6.3	31.5	7.2	30	—	—	—
Fibre (Englyst)	g	10.9	7.4	11.6	7.7	10.7	8.7	11.0	9.3	18	—	—	—
<i>Vitamins:</i>													
A Retinol equivalent	mcg	1,558	701	1,441	870	1,984	614	1,494	945	700	889	889	889
B ₁ Thiamin	mg	2.5	0.8	2.4	0.6	2.3	0.6	2.4	0.5	1.1	2.0	2.0	2.0
B ₂ Riboflavin	mg	3.5	0.6	3.4	0.5	3.4	0.6	3.7	0.5	1.3	1.8	1.8	1.8
Niacin	mg	33.1	12.9	27.5	9.7	25.1	12.2	31.8	9.4	18	17.3	17.3	17.4
B ₆ Pyridoxine	mg	2.5	0.3	2.2	0.0	2.2	0.2	2.5	0.1	1.5	2.4	2.4	2.4
B ₁₂	mcg	5.5	0.6	4.2	1.3	4.6	1.5	8.7	3.3	1.5	3.9	3.9	3.9
Folate	mcg	321.9	70.9	324.9	75.7	323.0	83.5	356.7	82.5	200	312	312	318
C Ascorbic Acid	mg	132.8	28.8	133.9	21.7	138.2	23.8	137.6	13.8	40	78.8	78.8	80.9
D Calciferol	mcg	2.6	0.0	2.7	0.3	3.5	0.6	6.7	4.9	10	4.7	4.7	4.7
E Tocopherol	mg	4.5	0.2	3.6	0.6	4.0	0.9	4.6	0.1	>4	—	—	—
<i>Minerals:</i>													
Ca Calcium	mg	1,377	308	1,402	326	1,463	278	1,481	236	1,000	1,011	1,011	948
Na Sodium	mg	3,912	706	3,503	324	3,386	400	3,770	549	1,600	4,814	4,814	3,625
K Potassium	mg	3,895	231	3,732	815	3,654	430	3,881	492	3,500	3,485	3,485	2,974
Fe Iron	mg	16.9	1.4	15.6	0.8	15.9	1.3	18.1	0.4	11.3	14.7	14.7	14.7
Zn Zinc	mg	11.2	0.4	9.3	0.7	9.2	0.2	11.2	0.6	9.5	11.3	11.3	9.5
Se Selenium	mcg	24.6	3.6	20.5	3.5	21.9	4.1	32.5	20.4	70	67.5	67.5	45.7
Mn Manganese	mg	2.0	2.0	2.2	1.9	2.0	2.1	2.1	2.1	1.4	—	—	—
I Iodine	mcg	86.8	24.3	96.7	11.7	110.8	23.0	115.3	11.7	140	97.7	97.7	106

Notes: ^aMales 15-18 years. DoH (1991); ^bEves and Gesch (2003)

Table III.
Mean nutrient provision
- two YOI prisons

Although the percentage of energy provided from protein in all menus was above the recommendations, in some cases double, these are lower than, and reflect the general population trends (Hoare *et al.*, 2004), and are considered satisfactory. Carbohydrate figures are in synergy and demonstrated a high percentage of energy from this source.

Non-starch polysaccharide/fibre figures are in the main encouraging, although there is no room for complacency and measures to continue to increase the fibre content of the diet should be encouraged.

Vitamins and minerals

In the male prisons, there are minor deficiencies for vitamin D, selenium and iodine in all menus; vitamin B₁₂ and calcium in the vegan menu; vitamin E in the vegetarian menu; zinc in all except the standard menu; and manganese in the standard, healthy and Halal menus.

Table IV.
Mean percentage contribution of macronutrients to energy – four male prisons

Percentage Energy from	Standard diet %	Healthy diet %	Vegetarian diet %	Vegan diet %	Halal diet %	Recommendations ^a %	Previous study ^b
Protein	13.8	11.5	11.1	10.5	12.6	(15)	13.7
Total fat	35.3	31.4	30.5	32.6	32.3	35	35.8
Of which saturated fat	9.8	8.4	7.4	9.5	8.5	11	–
Carbohydrate	51.0	57.2	58.6	56.9	55.3	50	50.5

Notes: ^aDoH (1991); ^b Edwards *et al.* (2001)

Table V.
Mean percentage contribution of macronutrients to energy – two female prisons

Percentage energy from	Standard diet %	Healthy diet %	Vegetarian diet %	Halal diet %	Recommendation ^a %
Protein	13.0	13.1	10.3	12.6	(15)
Total fat	39.2	29.5	37.0	35.0	35
Of which saturated fat	8.6	8.5	7.0	7.6	11
Carbohydrate	48.1	57.8	52.8	52.7	50

Note: ^aDoH (1991)

Table VI.
Mean percentage contribution of macronutrients to energy – two YOI prisons

Percentage energy from	Standard diet %	Healthy diet %	Vegetarian diet %	Halal diet %	Recommendations ^a %	Previous studies ^b	
						1996	1997
Protein	12.6	11.8	10.9	12.7	(15)	–	–
Total fat	31.3	28.3	31.6	32.0	35	36.6	40.8
Of which saturated fat	11.7	11.1	12.1	12.7	11	–	–
Carbohydrate	56.0	59.9	57.5	55.4	50	51.8	45.7

Notes: ^aDoH (1991); ^bEves and Gesch (2003)

In the female prisons, there are minor deficiencies for vitamins D and E, selenium and manganese in all menus.

In the YOI prisons there are minor deficiencies for vitamin D, selenium and iodine in all menus; vitamin E in the healthy menu; and zinc in the healthy and vegetarian menus.

There is debate (Eves and Gesch, 2003) regarding vitamin D within institutional feeding, as the amount contributed by other sources such as sunlight could be limited. This needs to be monitored and where insufficient is provided by the menu, as in the present study, consideration must be given for routine supplementation.

The more restrictive a diet becomes the greater likelihood there is of deficiency and vegetarians/vegans are vulnerable from the perspective of limited vitamin B12 provision (Phillips, 2005). Again, supplementation is advised to ensure that recommendations are met.

There is currently a debate on the consumption of “excessive” amounts of vitamin A with intakes averaging 1.5 mg per day over many years being linked to bone fractures, particularly in the elderly. This is further exacerbated where vitamin D is also below recommendations. As a result, the FSA (2005) has recommended that the consumption of liver and liver products be limited to no more than once per week and for individuals to reconsider the use of supplements containing vitamin A.

Minerals such as selenium, manganese, iodine, zinc and calcium were provided (on average) at levels below the Reference Nutrient Intake (RNI) in some menus, the provision of selenium being the most significant. Selenium is part of an enzyme that helps to prevent structures inside cells being oxidised. The amount of this enzyme increases with increasing selenium provision, even so, only about 55 per cent-65 per cent of dietary selenium is absorbed and therefore deficiency within menus could be material (DoH, 1991). Iodine was another mineral identified in most menus as being below RNI recommendations however, sufficient for lower reference nutrient intake (LRNI). Zinc was identified as a mineral salt for potential concern within restricted diets.

Provision of sodium was well in excess of (maximum) recommendations in all menus in all prisons and could be higher still as salt added by personal choice was not included, where this was provided at the service counter or on the tables. High provision of sodium reflected the inherent nature of an inmate’s diet, which is based on a high intake of bread and ready-made convenience products. Certainly, consideration should be given to the greater use of kitchen prepared soups and other products with less reliance, where possible on bought-in items.

Overall, nutrient availability for the male prisons compares favourably with a previous study (Edwards *et al.*, 2001), which investigated the nutritional intake of eight male prisons over a 24-hour period. This earlier study used a different methodology; a visual estimation technique to measure the weight of food chosen by prisoners, as the basis for calculating nutritional intake. The primary variations in results are for vitamin A, although the high figure in this earlier study was due to the consumption of liver; vitamin C which is higher in the current study; but vitamins D and E are slightly lower in the current study. Clearly, an exact comparison would not be entirely valid but it does add support to the methodology used.

The only other study on YOIs (Eves and Gesch, 2003) also provides a basis for comparison. Here, provision and intakes are broadly similar, except in the current

study, where the provision of vitamins A, B₂ Niacin and C are higher, although vitamin D is lower.

Balance of good health

Each of the prison menu cycles was analysed and compared with the Balance of Good Health Model, which all prisons have attempted to embrace, although some are more successful than others; results are summarised below.

Bread, other cereals and potatoes

Commercially produced sliced, wrapped bread was generally available at both the midday and evening meals and prisoners were restricted to a maximum of six slices although in practice this tended not to be the case and they could take *ad libitum*. The bread of choice was white, but most prisons made “brown” bread available. One prison produced white “homemade” rolls once per day. In addition, a sandwich/roll/bap was available as a main course option for most meals.

Potatoes were available daily (in addition to or in lieu of rice) and in most cases at both the midday and evening meals. Jacket (baked) potatoes were offered regularly during all of the menu cycles, normally with a filling as a main course item, and pasta dishes also featured regularly. Rice was available at most meals but only “white” rice was served.

Breakfast in all prisons was given as a pack, either with the evening meal or in the morning, and contained *inter alia* a portion of breakfast cereal, which varied daily.

Fruit and vegetables

Fresh fruit was offered once a day in all prisons but invariable there was a choice between dessert or fruit rather than dessert and fruit. Choice was somewhat restricted and included apples, pears, bananas and oranges, although two prisons offered a wider selection including peaches and melon slices. Tinned fruit was offered in the order of once per week and a “fruit pudding” also once per week.

Vegetables were offered daily but these were often tinned or frozen, although fresh vegetables, such as cabbage, were also offered. One prison included courgettes and aubergines but this was a “one-off”. Salads were offered as a main meal component, on average, three out of four days.

Overall, the amount of fruit and vegetables offered was slightly less than the recommended five portions per day. Wherever possible, other seasonal, perhaps local, fruit should be sourced thereby increasing variety and tempting consumption. There is also a heavy reliance on tinned and frozen vegetables, which whilst not necessarily nutritionally inferior, does restrict the choice available. Wherever possible, fresh, in season items should be considered.

Meat and fish alternatives

Fish dishes were available on most days as a main course item, primarily as breaded filleted fish, fish cakes, fish pies or poached fish, but the variety tended to be repetitive. Fish was also incorporated into other dishes such as canned tuna rolls and sandwiches, canned tuna or sardine salads, and canned tuna as a jacket potato topping. This heavy reliance on canned tuna, which is not classified as an oily fish (FSA, 2006) and the

overall availability means that the consumption of fish, particularly oily fish, is unlikely to meet the current recommendations.

Milk and dairy foods

Milk was available daily with the breakfast pack, although there were comments on the adequacy of the amount provided. In addition, milk products such as custard were available which helped to ensure the adequacy of calcium in all except the vegan menu in one male prison, where vitamin B₁₂ also failed to meet the recommendation; as did vitamin D in all prisons.

Foods containing fat; foods and drink containing sugar

The issue of fat in the diet is addressed earlier whilst sugar in the diet did not present a problem as sugary drinks were not offered and sugar, being provided in sachets, could be added to hot drinks as a personal choice. The amount of sugar added during the cooking process was not considered to be excessive, primarily because of budgetary considerations.

Discussion

The prison catering service has made considerable progress since the introduction of the pre-select menu (Edwards *et al.*, 2001) and menus have been structured to enable prisoners to select a range of different meals hence, if a prisoner wishes to eat a vegetarian meal today, Halal tomorrow and healthy eating the following day, (s)he has the opportunity to do so.

The overall balance of the menu, with minor exceptions, tends to be good with dishes being mainly “traditional” with the emphasis on starchy, high carbohydrate foods, a menu pattern not dissimilar to that seen during the Second World War, as a result of rationing (Burnett, 1979). Conversely, a number of dishes, including burgers and pies, are purchased frozen, ready made, as they are an extremely convenient and cost effective means of providing an entrée. Even so, care must be taken to monitor their usage as historically, they tend to be high in salt (Mathews and Strong, 2005) and often fat (Stewart-Knox *et al.*, 2003).

The Government have pledged to provide guidance in selecting healthier choices (HM Government and DoH, 2005) although there is a dilemma in the term “healthy choice”; a food could be low in fat but high in salt. This issue arose in discussions with catering officers and their interpretation of the term “healthy diet” where many annotated menus based on their own interpretation which was invariably fat content. In the main, kitchen staff associated a healthy diet with dishes perceived as being low fat and salad items. This reliance on “healthy” salad items was epitomised in one prison where chipped potatoes had been substituted with Potato and Russian salad, both of which were made with full-fat mayonnaise resulting in a higher percentage of energy from fat than the standard menu. Other criteria, such as reducing salt, were also taken into account when considering what was healthy but generally this was not the governing factor. Some prisons rely heavily on boiled and mashed potatoes, whilst others continue to serve high fat options. Other potato dishes, such as Duchesse and Macaire, which could be finished in the oven, and which retain the healthy profile might be considered.

Nutritional guidance, advice and knowledge

If one of the purposes of a custodial sentence is to assist individuals to become more responsible members of the community on release, then good nutrition should form part of this strategy. It is essential, therefore, that during their time in prison, inmates have the opportunity to experience appetising, attractively presented food demonstrating a healthy balanced diet thereby illustrating what can be achieved and the benefits this can provide. It is essential, therefore, that a healthy eating advice/guide strategy forms part of this.

When individuals first enter prison they are seen by “Health Care” and if necessary the doctor, where any health concerns, weight or dietary related problems can be discussed and addressed. They also receive an introduction to the gymnasium and where necessary, a voluntary remedial programme can be arranged. They have the opportunity during the course of their sentence to return for further exercise-diet related advice.

In all the prisons visited, this seemed to work well, and staff were enthusiastic about offering information although prisoners had to actively seek advice and nowhere was there a “programme” which sought to give general dietary guidance on a regular basis. Similarly, with the exception of the education centres, there were no pamphlets or publications freely available giving dietary information.

The healthy menu options were normally identified on the menu using symbols which, in some cases were unreliable, and in many cases quite misleading. At the service counter no guidance, either verbal or visual, was available to encourage or help prisoners, for example, to move away from the less healthy potatoes and select more healthy options; or to limit their portion sizes. As a result, the nutritional knowledge amongst inmates was patchy. Examples of this include one prison where the inmates were decrying the loss of doughnuts and refusing to eat yoghurts while at the same time demanding “body building” supplements such as those that could be purchased from the prison shop; “protein is something purchased in the canteen and comes in a jar”.

Conclusions

This research sought to establish firstly whether the meals provided by the prison service enable all prisoners to follow government guidelines on nutrition and healthy eating. It can be concluded that with the exception of some nutrients, prisoners have access to and are able to choose a nutritionally balanced diet. All prisons have attempted to make available meals and menus that conform to the Balance of Good Health model; however, in some prisons this is hampered, primarily because menus have not been annotated accurately and some dishes are not always as healthy as they might or could be.

Second, the research sought to evaluate the extent to which prisoners actually follow healthy eating guidelines and any factors that inhibit them. It can be concluded that, within any methodological limitations, prisoners, in the main, do consume a healthy balanced diet, which, with minor exceptions conforms to current guidelines. The main factor and barrier to consumption is that prisoners, in most cases, do not actually understand what constitutes a healthy balanced diet.

Although advice and guidance may be provided, and the opportunity given to make a healthy choice, prisoners do not necessarily have to follow that advice and many

claimed to be on a healthy diet, but at the same time chose to add foods such as chips. Even so, this is not a rationale for inactivity and it is important that individuals receive advice on healthy eating so that if they so wish, they can make a healthy choice. Clearly, any healthy eating strategy must be accompanied by information and education to empower the users and encourage involvement rather than alienate. Subtle changes within a food service operation can be made to improve the nutritional quality of menus without the client being aware and often this type of implicit rather than explicit change is more successful. Care must be taken with menu manipulation and should, wherever possible, reflect consumers' normal food habits. As one prison governor explained "...it is far cheaper to give prisoners doughnuts, if that is what they want, rather than to pay for a new roof...".

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