

Original

RESP

Analysis of the diet in a Spanish prison and the level of perception in a sample of prisoners

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ABSTRACT

Introducción: An analysis is carried out of the diet provided at the Quatre Camins prison (Barcelona), where meals were modified in the first quarter of 2017 to provide a healthier diet.

Objectives: The new meals are described in relation to the most prevalent chronic and metabolic pathologies in the prison population and it is checked if they correspond to a healthy diet. The food offered at the prison shops and the perception of prisoners regarding prison food are also analysed.

Materials and methods: A mixed methodology study was carried out: a) a descriptive analysis of the new food offered by the kitchen service; and b) an analysis of the meals using the Spanish Healthy Eating Index (IASE) as a reference; as well as a description of the most prevalent pathologies in the prison. To determine the prisoners' perceptions, an *ad hoc* self-completed questionnaire was designed that consisted of four closed Likert questions and four open questions about the perception of prison food. The prisoners who responded to the questionnaire did so voluntarily, anonymously and under informed consent.

Results: A sample of 22 prisoners was used. The score according to the IASE is 60.5 points. The assessments of the sample of 22 prisoners regarding quality, quantity and perception of diet as healthy does not reach pass.

Discussion: Access to safe water and food meets the requirements for healthiness, quality and quantity regulated by the current *Prison Regulation*. The results obtained suggest that the diet in the prison "needs changes" according to the IASE.

Key words: healthy diet, prisons, chronic disease, feeding behavior, public health, metabolic disease.

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INTRODUCTION

The diseases with the greatest incidence amongst the prison population in the last century were those related to the respiratory tract and malnutrition, and unhealthy conditions were a contributory or aggravating factor in such pathologies¹. The Spanish *Prison Regulations* (Reglamento Penitenciario)² in fact gave great importance to the inmates' diet. In article 226 of the Regulations it states that "the inmates in all prisons shall be provided with a suitably prepared diet, which should respond to the dietary requirements of the prison population and the specific needs of age, health, work, climate, costumes and, whenever possible, personal and religious convictions". It also establishes that:

- "the diet of ill inmates shall be subject to medical control".
 - "in those prisons where children accompany their mothers, the necessary resources shall be provided to feed each child in accordance with their needs and as per the instructions of the medical service"²
- The situation in Catalonia regarding concern for nutrition of the prison population is very similar. The Autonomous Community has had powers since 1983 over the management of prisons after transfer under *Royal Decree 3482/83 of 28 December*, and the concern over diet can be seen in article 89 of *Decree 329/2006, of 5 September*³, which specifies:
- That "healthcare services of the establishment shall control and ensure that the inmates' diet is

a balanced one that responds to adequate criteria of nutrition, and that conforms in all cases with the dietary requirements of the prison population and specific health needs and that respects personal and religious convictions”.

- That “the diet of ill inmates shall be subject to specific supervisions by the medical services of the prison, as well as that of minors who, in accordance with prison legislation, live with their mothers”.

There are few previous studies about the analysis of diet in Spanish prisons. A study⁴ carried out at the

old Barcelona Modelo prison showed after a detailed analysis of quality, quantity, temperature, variety, taste, noise and lighting, that the worst opinion about the food dispensed was reserved for the taste, followed by the variety. What was even more important was that the analysis of the diet, according to the Spanish Healthy Diet Index (IASE)⁵, gave a rating of “acceptable” without being “healthy”.

In Catalonia the collective prison kitchens are managed by a public company of the Regional Government of Catalonia: the Centre of Initiatives for

Table 1. Conversion of the new range of CIRE meals, from February 2017 onwards.

Previous CIRE diet	Current CIRE diet	Supplements
Astringent	Astringent	
Astringent without fish	Astringent	
Coeliac	Specific medical diet: coeliac	
Soft without fish	Specific medical diet: soft W/F	
General	General	
Diabetic supplement: 1 piece of fruit + 4 crackers (ham /light cheese)	Special	Only diabetics 2 times/day
Special/Moslem	Special	
Diabetic	Special	Diabetic Supplement
Diabetic/Moslem	Special	Diabetic Supplement
Liver/high blood pressure	Special	
Liver/Moslem	Special	
Special without fish	Special without fish	
Diabetic/without fish	Special without fish	
Liver/Moslem/without fish	Special without fish	
Liver/without fish	Special without fish	
Moslem/without fish	Without fish	
General/without fish	Without fish	
Moslem	Moslem	
Moslem Ramadan	Moslem	
Diabetic soft	Soft	Diabetic Supplement
Soft/minced	Soft	Minced
Soft/Moslem	Soft	
Vegetarian	Vegetarian	
Soft bread		Soft bread
One glass of fruit juice/not milk	Dairy free	
One glass of sugar-free fruit juice	Dairy free	
1 skimmed milk yoghurt lunch		Skimmed milk yoghurt lunch
2 yoghurt, instead of fruit lunch		2 yoghurt
Allergic to lactose	Specific medical diet: allergic to lactose	

Note. CIRE: Centre d’Iniciatives per a la Reinserció.

Table 2. CIRE weekly meal planning

Diet	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
General	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries
Moslem	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries
Vegetarian	White coffee, Edam cheese	White coffee, Edam cheese	White coffee, Edam cheese	White coffee, Edam cheese	White coffee, Edam cheese	White coffee, Edam cheese	White coffee, Edam cheese
Special	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries
Soft	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries
Without fish	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries	White coffee, turkey slices, pastries
Dairy free	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar
	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries
Astringent	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar	Fruit juice with no added sugar
	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries	Turkey slices, pastries
Diabetic supplement	Crackers, ham/light cheese	Crackers, ham/light cheese	Crackers, ham/light cheese	Crackers, ham/light cheese	Crackers, ham/light cheese	Crackers, ham/light cheese	Crackers, ham/light cheese
	1 piece of fruit	1 piece of fruit	1 piece of fruit	1 piece of fruit	1 piece of fruit	1 piece of fruit	1 piece of fruit
Lunch							
1st course							
General	Rice casserole with chicken	Spaghetti a la napolitana	Lentils with boiled vegetables	Mixed salad with turkey	Haricot beans with greens	Tagliatelle a la napolitana	Fisherman style potatoes
Moslem	Rice casserole with chicken	Spaghetti a la napolitana	Lentils with boiled vegetables	Mixed salad with turkey	Haricot beans with greens	Tagliatelle a la napolitana	Fisherman style potatoes
Vegetarian	Rice casserole with vegetables	Spaghetti with boiled tomato	Lentils with boiled vegetables	Mixed salad with cheese	Haricot beans with greens	Tagliatelle a la napolitana	Stewed potatoes with vegetables
Special	Rice casserole with vegetables	Spaghetti with boiled tomato	Lentils with boiled vegetables	Mixed salad with cheese	Haricot beans with greens	Tagliatelle a la napolitana	Stewed potatoes with vegetables
Soft	Rice casserole with vegetables	Boiled spaghetti	Lentils with boiled vegetables	Carrots, potatoes and onion	Potato and carrot purée	Boiled tagliatelle with oil	Stewed potatoes with vegetables
Without fish	Rice casserole with vegetables	Spaghetti with boiled tomato	Lentils with boiled vegetables	Mixed salad with cheese	Haricot beans with greens	Tagliatelle a la napolitana	Stewed potatoes with vegetables
Astringent	Rice casserole with chicken	Boiled spaghetti	Potato and carrot purée	Carrots, potatoes and onion	Potato and carrot purée	Boiled tagliatelle with oil	Potatoes carrots and onion

Table 2. CIRE weekly meal planning (continuation)

Diet	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Main course							
General	Veal meatballs with potatoes	Andalusian style hake fillet	Pork cheeks: general	Hake fillet with Russian salad	Chicken leg with mushrooms and potatoes	Roast chicken leg	Turkey sausages with tomato sauce
Moslem	Veal meatballs with potatoes	Andalusian style hake fillet	Roast chicken leg	Hake fillet with Russian salad	Chicken leg with mushrooms and potatoes	Roast chicken leg	Turkey sausages with tomato sauce
Vegetarian	Pinto beans with greens	Sautéed vegetables with potatoes	Sautéed vegetables	Haricot beans with greens	Brussels sprouts in mustard sauce	Pinto beans with greens	Vegetables sticks
Special	Boiled veal meatballs	Grilled hake fillet	Roast chicken leg	Hake fillet with Russian salad	Chicken leg with mushrooms and potatoes	Roast chicken leg	Turkey sausages
Soft	Boiled veal meatballs	Grilled hake fillet	Roast chicken leg	Hake fillet with Russian salad	Chicken leg with mushrooms and potatoes	Roast chicken leg	Turkey sausages
Without fish	Veal meatballs with potatoes	Poultry sausages	Roast chicken leg	Boiled veal meatballs	Chicken leg with mushrooms and potatoes	Roast chicken leg	Turkey sausages
Astringent	Veal meatballs with potatoes	Poultry sausages	Carrot purée	Potatoes carrots and onion	Potatoes carrots and onion	Boiled tagliatelle with oil	Turkey sausages
Garnish	Roast tomato	Roast bell pepper	Sautéed vegetables	Russian salad	Roast courgette	Roast tomato	Roast bell pepper
Dessert							
General	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Moslem	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Vegetarian	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Special	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Soft	Baked apple	Baked apple	Baked apple	Baked apple	Baked apple	Baked apple	Baked apple
Without fish	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Astringent	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Dinner							
1st course							
General	Fish and rice soup	Green beans and potatoes	Vegetable and potato stew	Vegetable and pasta soup	Vegetable and rice soup	Vegetable and potato stew	Fish and rice soup
Moslem	Fish and rice soup	Green beans and potatoes	Vegetable and potato stew	Vegetable and pasta soup	Vegetable and rice soup	Vegetable and potato stew	Fish and rice soup
Special	Vegetable and rice soup	Green beans and potatoes	Vegetable and potato stew	Vegetable and pasta soup	Vegetable and rice soup	Vegetable and potato stew	Vegetable and rice soup
Astringent	Vegetable and rice soup	Potato and carrot purée	Boiled potatoes carrots and onion	Vegetable and rice soup	Vegetable and rice soup	Boiled couscous	Vegetable and rice soup
Without fish	Vegetable and rice soup	Green beans and potatoes	Vegetable and potato stew	Vegetable and pasta soup	Vegetable and rice soup	Vegetable and potato stew	Vegetable and rice soup
Soft	Vegetable and rice soup	Green beans and potatoes	Vegetable and potato stew	Vegetable and pasta soup	Vegetable and rice soup	Vegetable and potato stew	Vegetable and rice soup
Vegetarian	Vegetable and rice soup	Green beans and potatoes	Vegetable and potato stew	Vegetable and pasta soup	Vegetable and rice soup	Vegetable and potato stew	Vegetable and rice soup

Table 2. CIRE weekly meal planning (continuation)

Diet	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Main course							
General	Turkey roll in vegetable and tomato sauce with potatoes	Potato and onion omelette	4 cheese pizza	Veal burgers	Chicken sausages in tomato sauce	Veal meatballs in tomato sauce	Boiled eggs
Moslem	Turkey roll in vegetable and tomato sauce with potatoes	Potato and onion omelette	4 cheese pizza	Veal burgers	Chicken sausages in tomato sauce	Veal meatballs in tomato sauce	Boiled eggs
Special	Turkey roll with vegetables	French omelette	Grilled chicken breast	Veal burgers	Chicken sausages	Boiled veal meatballs	Boiled eggs
Astringent	Turkey roll with vegetables	French omelette	Grilled chicken breast	Veal burgers	Chicken sausages	Poultry sausages	Boiled eggs
Without fish	Turkey roll with vegetables	French omelette	Grilled chicken breast	Veal burgers	Chicken sausages	Boiled veal meatballs	Boiled eggs
Soft	Turkey roll with vegetables	French omelette	Grilled chicken breast	Veal burgers	Chicken sausages	Poultry sausages	Boiled eggs
Vegetarian	Escalivada*	Potato and onion omelette	4 cheese pizza	Potato filled with spinach au gratin	Courgette omelette	Couscous curry and vegetables	Boiled eggs
Garnish							
General		Salad	Roast natural tomato	Baked potato	Baked potato	Boiled rice	Escalivada*
Moslem		Salad	Roast natural tomato	Baked potato	Baked potato	Boiled rice	Escalivada*
Special		Salad	Roast natural tomato	Baked potato	Baked potato	Boiled rice	Escalivada*
Astringent				Baked potato	Baked potato	Boiled rice	Escalivada*
Without fish		Salad	Roast natural tomato	Baked potato	Baked potato	Roast courgette	Escalivada*
Soft		Roast courgette	Roast aubergine	Baked potato	Baked potato	Roast courgette	Escalivada*
Vegetarian		Salad	Roast natural tomato			Roast courgette	Escalivada*
Desert							
General	Apple	Apple	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt
Moslem	Apple	Apple	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt
Special	Apple	Apple	Skimmed milk yoghurt	Skimmed milk yoghurt	Apple	Skimmed milk yoghurt	Skimmed milk yoghurt
Astringent	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Without fish	Apple	Apple	Skimmed milk yoghurt	Skimmed milk yoghurt	Apple	Skimmed milk yoghurt	Skimmed milk yoghurt
Soft	Apple	Apple	Skimmed milk yoghurt	Skimmed milk yoghurt	Apple	Skimmed milk yoghurt	Skimmed milk yoghurt
Vegetarian	Apple	Apple	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt	Flavoured yoghurt

Note: Week selected at random. CIRE: Centre d'Iniciatives per a la Reinserció.

*Catalonian style roast veg.

Reinsertion (*Centre d'Iniciatives per a la Reinserció* (CIRE)). In February 2017, the nutrition department of this company started to redesign the menus and unified many of the diets that had coexisted up till then. This study describes and analyses these new menus using a random gathering of the daily spreadsheets, the new diets offered are checked to see if they are healthy for the prison population and perceptions about the diets taken from a sample of inmates are described. Finally, an analysis is run to see if the new menus match the dietary recommendations for the chronic and metabolic pathologies that are most prevalent amongst the inmates.

MATERIALS AND METHODS

A cross-sectional descriptive study was carried out of the new diets offered by the kitchen service, managed by the public company CIRE, regarding the number of medically prescribed diets and in particular, the description of the diet called the “special diet”. The study was carried out at the Quatre Camins Prison (Barcelona), where approximately 1,400 adult males are interned. Table 1 describes the changes that the supply company began to implement in the first

quarter of 2017 to the collective nutrition of Catalanian prisons and in particular, to the Quatre Camins Prison. A template was prepared to give a schematic view of the different meals offered on a given day and the respective dishes (Table 2).

A cross-section dated 26/4/2017 was carried out on the Prison IT System of Catalonia (*Sistema Informático Penitenciario de Cataluña* (SIPC))⁶ to obtain the diets prescribed by doctors. The analysis by groups of the food in these menus (Table 2), according to the IASE, is described in Table 3. Scores were given of the groups of foods of the daily menus randomly selected from the Department of Nursing/Psychiatry via the IASE. The distribution sheets of meals per module were obtained from the prison kitchen service. The IASE consists of ten variables by groups of foods: cereals-derivatives, vegetables-root vegetables, fruit, milk and derivatives, meat, legumes, sausage-cold meats, sweets, soft drinks-sugar and variety-diet. The categories of the IASE5 have a maximum score of 100 and are classified as: “healthy nutrition”, at more than 80 points; “needs changes”, at between 50 and 80 points; “not healthy”, at 50 points. This scale was drawn up from the Consumption Frequency Questionnaire (*Cuestionario de Frecuencia de Consumo* (CFC)) and from the recommendations of

Table 3. Quality of the Catalanian prison diet based on the meals selected in the CIRE weekly menu planning and scores as per the IASE

Variables	Daily (10)	3 or more a week (7.5)	1 or 2 a week (5)	Less than 1 a week (2.5)	Never or hardly ever (0)
Daily consumption					
1. Cereals and wheat	10				
2. Vegetables and root vegetables	10				
3. Fruit	10				
4. Milk and dairy products	10				
Weekly consumption					
5. Meat	10				
6. Legumes		7,5			
Occasional consumption					
7. Cured sausage and cold	Daily (0)				
8. Sweets	Daily (0)				
9. Soft drinks with sugar	Daily (0)				
10. Variety	2	1			
TOTAL:	60,5				
RESULT: Needs changes					

Note. CIRE: Centre d'Iniciatives per a la Reinserció. IASE: Spanish Index of Healthy Nutrition (Índice de Alimentación Saludable Español).

the Dietary Guides of the Spanish Society for Community Nutrition in 2004 (*Guías Alimentarias de la Sociedad Española de Nutrición Comunitaria en 2004*). The IASE is based on the methodology used for the HEI, or *Healthy Eating Index*, and this tool was selected for its usefulness in estimating the quality of the diet in a population, in this case the prison population of Quatre Camins.

The data base of the Primary Healthcare IT System of the Catalan Health Institute (l'Institut Català de la Salut) e-Cap: DbsForm ("Health problems") was used for the diagnostic classification of pathologies. Inmates' perceptions were assessed qualitatively by means of a brief interview and completing an *ad hoc* questionnaire, structured one closed question, four with a value from 1 to 10 points, and three open questions, which were answered by a sample of 22 randomly selected inmates during the nursing examination. Participation was voluntary, anonymous and given under informed consent.

RESULTS

The manager and technical director of the food service of the CIRE informed the healthcare services of the prison via a corporate electronic mail message of the changes to be made to the inmates' diets, describing in detail what could be prescribed for medical reasons. The diet now called "special" replaces the previous diets issued under medical prescription, depending on the different medical pathologies, such as "diabetic", "high blood pressure", "dyslipidemia" or "obesity".

The Special diet consists of a balanced diet, low in salt (1,500-2,000 mg/day of sodium) and with a heart-healthy lipid profile. It is a diet indicated for any pathology that requires restrictions on salt, that is in a compensated stage, in other words, without severe oedemas or abdominal fluid retention (ascites). In the opinion of the CIRE it is recommended for inmates with high blood pressure, excess weight, obesity or dyslipidemia. The diet can also be used for diabetic inmates as it distributes as part of its composition throughout the day a carbohydrate content of 50-55% of the total energy value (TEV) and is low in fast absorption sugars. Therefore, and according to the nutrition service of the CIRE, this diet excludes pork and uses less fatty, leaner meats such as veal, chicken or turkey. Fried dishes, stews and casseroles are sys-

tematically excluded, and so the cooking processes used are without salt, grilled, roast or steamed, boiled in stew form using a dietary approach. The bread and crackers that accompany the dishes are salt free.

Breakfast for inmates with diabetes *mellitus* type 1 or 2 consists of a sandwich with turkey sausage meat or fat and salt free cheese. They are also given a hot drink. An additional supplement to the breakfast is two crackers with diet jam, and a piece of fruit for elevenses. When lunch is served, they receive four crackers with light cheese slices for an afternoon snack, and with the dinner, they are given a piece of fruit or skimmed milk yoghurt as a night time dietary supplement.

Other medically prescribed diets are not described since they are not associated with metabolic diseases, such as the "soft diet", "diet without fish", "astringent diet", "diet specific celiac diet" and "dairy free diet".

Quantitative results

There were a total of 348 diets prescribed for a population of 1,428 inmates (24.3%), of which 146 were "special" (10.5%)⁶.

The score of the analysis by groups of foods was 60.5 points; or rather, a score defined as "needs changes", according to the categories of the IASE⁵.

As regards frequency of consumption, in the sweets category, the score assigned is 0, bearing in mind the criteria for the minimum score of this variable and that the kitchen service prepares and serves pastries every day at breakfast.

In the category of sausages and cold meats, the one served every day is turkey luncheon meat, and so the score has also been classified in the column of "daily consumption" with a score of 0; if it was "never or hardly ever", the score would be 10.

2 points were assigned to the criteria "variety", as it the recommended daily consumption of the groups of foods is complied with, although this criterion does not correlated with the perception of variety mentioned by the inmates in the interviews.

Table 4 shows the prevalence of chronic and metabolic diseases amongst the inmates of Quatre Camins prison. 43.6% of the inmates would be candidates for receiving a "special" diet, but only 10.5% of them had the diet prescribed.

Qualitative results

40% of the diners did not notice any substantial changes to the menus in recent months, stating that

“it’s always bad”. As regard the quality, quantity and if they considered it to be healthy, the average score did not reach pass (4.5 points), which underlines the negative perception of the prisoners in these three areas.

92% of the interviewees answered that they bought food at the prison shop. 8% of the interviewees declared that they could not buy any food or drinks because they did not have the means to do so, and so only eat the food offered by the prison three times a day. It was asked why the prisoners consume products from the shop and the answers included: “to have some variety”, “because of the lack of food”, “because the food is awful”, “to eat more”, “to compensate”, “because I don’t get enough with breakfast, lunch and dinner”, “because I feel like it”, and “because I’m not satisfied with the food”. One of the interviewees stated that “I don’t eat anything the prison offers because I don’t like what there is and because I can buy food” and said that many inmates do the same as he does.

DISCUSSION

Following the ethnographic lines of the article by Fornons⁷, after the changes established in the diet of the CIRE, it could be seen that pork and pork products were removed from all the diets, regardless of the

beliefs professed by the inmate, to make it “healthier”. Only roast pork cheeks are served twice a month as a special dish in the general diet. The fact that this type of meat has been removed from all the diets is a measure that solves the problems of cooking processes crossed with oils or surfaces in contact with different raw materials.

In the study by Sáiz-Izquierdo et al.⁴, negative assessments were given by inmates of the quality, taste, temperature and hardness of the meat, although they did not appear to object to the quantity, since they explained that they could have second helpings. Despite the changes made by the Dietetics and Nutrition Service of the CIRE in 2017, the diet offered only obtains 60.5 points and therefore the evaluation is one of “needs changes”. The outcome obtained by Sáiz-Izquierdo et al.⁴ was 58.4 points, a very similar result, and the researchers suggested changes to improve the scores, which included reducing the consumption of meat and increasing legumes as a main course. This measure could be a good choice, as one of the main complaints from inmates is in fact the hardness or undercooking of the meat. The proposed measure could therefore be an effective one since legumes are tasty, healthy and economical, and the prison would benefit by having a cost-sustainable menu.

It is also interesting to comment on the culinary and cooking techniques, since it is suggested that fry-

Table 4. Most prevalent pathologies at the Quatre Camins Prison

Obesity BMI>30	Dyslipidemia	Hepatitis C	High blood pressure	HIV	Diabetes type 1 and 2
16.3%	13.19%	11.4%	9.51%	6.6%	4.1%

Note. Total population of 1,378 inmates on the cut-off date of 27/3/2017, en total 601, 43.6% of the inmates with metabolic pathologies (in percentage terms). The most prevalent pathologies appear in dark grey below.

HIV: human immunodeficiency virus. BMI: body mass index.

Table 5. Description and analysis of the surveys on perception of diet at the Quatre Camins Prison in a sample of 22 inmates.

Level of satisfaction	Average 3.25		
Sufficient quantity	Average 4.9		
Healthy	Average 4.5		
Buys food at the prison shop	95%		
Reason for buying	Bad	Repetitive	Hungry
Food bought	Cheese	Cans	Pre-baked
	cured meats	Milk	biscuits
	Nuts	Potato crisps	All*
From all the food available at the prison, which one would you like that is not offered.	Fried food Variety of yoghurt	Fruit Milkshake	Fried eggs

Table 6. Food at the prison shop CIRE Quatre Camins.

Food and drink		
Fruit juice 330 ml	0% alcohol beer can 33 cl	Horchata 1 L
Coca-Cola tin 33 cl	Font Vella water 1.5 L	Font Vella Levité Lemon drink 1.25 L
Fruit juice/milk "Mediterráneo" 330 ml	Mango, coconut juice 1 L	
Tinned foods		
Stuffed olives 300 g	Sweetcorn 150 g	Squid American sauce 111 g
Mussels in spicy sauce 112 g	Pate Mina 80 g	Sweet red pepper 80 g
Tuna in hot sauce 111 g	Hot and spicy skewered olives 300 g	Turkey luncheon meat 400 g
Clams in water 112g	Tripe a la "madrileña" 380 g	Asturian bean stew 440g
Sliced pineapple 225 g	Fruit cocktail 220 g	Anchovies in oil 46g
Asparagus 230 g	White tuna in oil 110 g	Mackerel in oil 90 g
Country Russian salad 200 g		Sardines in oil 120 g
Food dairy products		
Condensed milk 170 g	Actimel yoghurt with strawberry and banana	Chocolate, strawberry, vanilla milkshake 1 L
Rice pudding	Cheese spread 200 g	Whole milk 1 L
Yogures fibra y cereales	Tabla 4 quesos 150 g	Skimmed milk 1 L
Cured sausage and meat		
Selection of Iberian sausage 100 g	Ham 100 g	Chorizo extra 100 g
Sobrasada 250 g		
General food		
Salted popcorn 18 g	Potato crisps 30 g	Mayonnaise 14 g
Chocolate cream 500 g	Cupcakes 150 g	Barquichoco biscuits 150 g
Whole wheat María biscuits 200 g	Intense flavour olive oil 1 L	Country style crackers
Gluten free white bread 300 g	Gazpacho 390 g	Cream of courgette soup 500 g
Dates 200 g	Chocolate filled biscuits 180 g	Cream of mushroom soup 500 g
Cough sweets 150 g	Trail mix 120 g	
	Peeled sunflower seeds 150 g	
	Sweets such as fruit gums, etc	

Note. CIRE: Centre d'Iniciatives per a la Reinserció.

ing and fats should be avoided and this measure was adopted by almost exclusively using oven cooking, grills or boiling, which possibly makes for a considerable improvement in terms of cardiac health, but which is hardly accepted or even rejected by the inmates. It is one reason why many inmates ask to be taken off the special diet.

There is therefore a major difference between the prescribed "special" diets and the number of diagnoses of metabolic diseases that require this type of diet, which shows that there is a problem of dietary under-prescription.

On the other hand, there are studies^{4,9} that affirm that increasing the variety of fresh fruit available at lunch, breakfast or afternoon snack can be a good option in preventing consumption of products from the prison shops, which takes place in over 95% of the surveyed inmates. In some Latin American countries, such as Colombia⁸, families are permitted to bring food into prison for the visits, and are generally typical meals; although in Spain the prison regulations prohibit this practice², probably to ensure control and hygiene of foodstuffs and maintain equality of nutrition amongst the prison population.

The conclusion is that the analysis by groups of foods of the meals offered by the CIRE shows that the diet needs changes, according to the IASE, since the score compared to the previous study in 2014 has hardly changed, despite recent changes in planning of planned menus and new cooking techniques mentioned in this article. It would therefore be advisable for the Dietetics and Nutrition Service of the CIRE to revise the menus, so as to correct the small deviations that were detected. These include reducing cured meats and pastries served on a daily basis, offering more variety in fruit and vegetables, increasing legumes as an option for the main course, and revising the thawing and cooking techniques of foods such as fish, eggs and meat to make them more palatable.

Another aspect requiring improvement is the food offered at the prison shops. It is suggested that products that are recommended for healthy eating should be included, such as sugar-free drinks, different types of fruit, fresh vegetables that can be eaten raw, brown bread and cereals, fresh cheese, etc.

As regards inmates' perceptions, the improvements made in the first quarter of 2017 have not been noted, either in terms of taste or quality of the meals.

Most of the medically prescribed diets drawn up before 2017 have been simplified by the CIRE in the form of one single diet, the "special diet", which covers all types of infectious and metabolic diseases. This means that any inmate who has one of these pathologies has to be fed with the same diet.

To sum up, the diet in prison needs to be improved. It is recommended that the food service of the CIRE and prison healthcare teams work together on this area. Implementing programmes to promote healthy habits, as suggested by other authors⁹, may also be beneficial.

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REFERENCES

1. Parrado MS. La alimentación en la cárcel provincial de Valladolid (1950-1951). *Revista de Folklore*. 1991;123. [fecha de acceso: 30 Ene 2017]. Disponible en: <https://funjdiaz.net/folklore/07ficha.php?id=961>
2. Reglamento Penitenciario: Real Decreto 190/1996, de 9 de febrero, por el que se aprueba el Reglamento Penitenciario. BOE. 15 Feb 1996;40:5380-435. pp. 56. [actualizado: 26 Mar 2011; fecha de acceso: 3 Feb 2017]. Disponible en: <https://www.boe.es/buscar/act.php?id=BOE-A-1996-3307>
3. Decret 329/2006, de 5 de setembre, pel qual s'aprova el Reglamenté d'organització i funcionament dels serveis d'execució penal a Catalunya. 2006;4714: 37902-22. [fecha de acceso: 3 Feb 2017]. Disponible en: http://dogc.gencat.cat/ca/pdogc_canals_interns/pdogc_resultats_fitxa/?documentId=460252&language=ca_ES&action=fitxa
4. Sáiz-Izquierdo ME, Fornons D, Medina FX, Aguilar-Martínez A. Análisis del servicio de comedor y la opinión de los usuarios en un centro penitenciario de Cataluña. *Nutr Hosp*. 2014;30:213-8.
5. Norte A I, Ortiz R. Calidad de la dieta española según el índice de alimentación saludable. *Nutr Hosp*. 2011;26:330-6.
6. Departament de Justícia. Serveis penitenciaris. 2017 Dades estadístiques. Descriptors estadístics. [fecha de acceso: 26 Abr 2017]. Disponible en: http://justicia.gencat.cat/ca/departament/Estadistiques/serveis_penitenciaris/
7. Fornons D. Comer en la prisió; la identitat alimentaria de los presos de la cárcel Modelo de Barcelona. *Zainak*. 2011;34:147-60. [fecha de acceso: 30 Ene 2017]. Disponible en: <http://www.eusko-media.org/PDFAnlt/zainak/34/34147160.pdf>
8. Bejaranoo-Roncancio JJ, Celedón-Dangond CA, Socha-Gracia L. Alimentación penitenciaria: entre higiene y derechos. *Rev Fac Med*. 2015;63:527-35.
9. Gil-Delgado Y, Domínguez-Zamorano JA, Martínez-Sánchez-Suárez E. Valoración de los beneficios para la salud conseguidos mediante un programa nutricional dirigido a internos con factores de riesgo cardiovascular del Centro Penitenciario de Huelva. *Rev Esp Sanid Penit*. 2011;13:75-83.