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.

Objetivos: 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.

Materiales 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.

Resultados: 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 do 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.
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 study 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)\textsuperscript{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 skinned milk yoghurt lunch | Skinned milk yoghurt lunch |             |
| 2 yoghurt, instead of fruit lunch | 2 yoghurt |             |
| Allergic to lactose | Specific medical diet: allergic to lactose |             |

\textbf{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                      | 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                      | 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                   |
|                       |                                             |                                              |                                             |                                             |                                             |                                             |                                             |
| Lunch                 | 1st course                                  |                                              |                                              |                                             |                                             |                                             |                                             |
| General               | Rice casserole with chicken                 | Spaghetti a la napolitana                    | Lentils with boiling 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 boiling 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 boiling 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 boiling 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 boiling vegetables             | Carrots, potatoes and onion                  | Potato and carrot puree                       | Boiled tagliatelle with oil                  | Stewed potatoes with vegetables              |
| Without fish          | Rice casserole with vegetables              | Spaghetti with boiled tomato                 | Lentils with boiling 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 puree                      | Carrots, potatoes and onion                  | Potato and carrot puree                       | 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 rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 | Fish and rice soup                      |
| Moslem        | Fish and rice soup                      | Green beans and potatoes                | Vegetable and potato stew               | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 | Fish and rice soup                      |
| Special       | Vegetable and rice soup                 | Green beans and potatoes                | Vegetable and potato stew               | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 |
| Astringent    | Vegetable and rice soup                 | Green beans and carrots and onion       | Boiled potatoes and rice soup           | 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 rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 |
| Soft          | Vegetable and rice soup                 | Green beans and potatoes                | Vegetable and potato stew               | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 |
| Vegetarian    | Vegetable and rice soup                 | Green beans and potatoes                | Vegetable and potato stew               | Vegetable and rice soup                 | Vegetable and rice soup                 | Vegetable and rice soup                 | 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   | 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   | 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            | Salad                                       | Roast natural tomato                   | Baked potato                           | Baked potato                                 | Boiled rice                            | Escalivada*                            |                                       |
| Without fish          | Salad                                       | Roast natural tomato                   | Baked potato                           | Baked potato                                 | Roast courgette                        | Escalivada*                            |                                       |
| Soft                  | Roast courgette                             | Roast courgette                        | Baked potato                           | Baked potato                                 | Roast courgette                        | Escalivada*                            |                                       |
| Vegetarian            | Salad                                       | Roast natural tomato                   |                                        |                                               |                                        |                                        |                                        |
| 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, and 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 Catalan 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)) 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 IASE 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 scales was drawn up from the Consumption Frequency Questionnaire (Cuestionario de Frecuencia de Consumo (CFC)) and from the recommendations of 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).
Analysis of the diet in a Spanish prison and the level of perception in a sample of prisoners.

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 database of the Primary Healthcare IT System of the Catalan Health Institute (l'Institut Catalá 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 systematically 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 6. Food at the prison shop CIRE Quatre Camins.

| Category                        | Food and drink                                      | Tinned foods                                      | Food dairy products                        | Cured sausage and meat | General food                          | Sweets such as fruit gums, etc |
|--------------------------------|------------------------------------------------------|---------------------------------------------------|---------------------------------------------|------------------------|--------------------------------------|-------------------------------|
| **Food and drink**             |                                                      |                                                   |                                             |                        |                                     |                               |
| Fruit juice 330 ml             | 330 ml 0% alcohol beer can 33 cl                     | Horchata 1 L                                      | Condensed milk 170 g                        | Ham 100 g              | Salted popcorn 18 g                  |                               |
| Coca-Cola tin 33 cl            | Font Vella 1.5 L                                     | Font Vella Levité                                 | Actimel yoghurt with strawberry and banana | Chorizo extra 100 g    | Chocolate cream 18 g                 |                               |
| Fruit juice/milk "Mediterráneo"| 330 ml Mango, coconut juice 1 L                     |                                                   | Rice pudding                                | Mayonnaise 14 g        | Potato crisps 30 g                   |                               |
| **Tinned foods**               |                                                      |                                                   | Cheese spread 200 g                         | Barquichoco biscuits 150 g | Intense flavour olive oil 1 L       |                               |
| Stuffed olives 300 g           | Sweetcorn 150 g                                      | Squid American sauce 111 g                       | Yogures fibra y cereales                    | Cake 4 quesos 150 g   | Chocolate cream 18 g                 |                               |
| Mussels in spicy sauce 112 g   | Pate Mina 80 g                                       | Sweet red pepper 80 g                            |                                             |                        | Cupcakes 150 g                       |                               |
| **Food dairy products**        |                                                      |                                                   |                                             |                        | Gluten free white bread 300 g       |                               |
| Condensed milk 170 g           | Actimel yoghurt with strawberry and banana           | Chocolate, strawberry, vanilla milkshake 1 L     |                                             |                        | Gazpacho 390 g                      |                               |
| Rice pudding                   |                                                      |                                                   |                                             |                        | Dates 200 g                         |                               |
| Yogures fibra y cereales       |                                                      |                                                   |                                             |                        | Chocolate filled biscuits 180 g      |                               |
| **Cured sausage and meat**     |                                                      |                                                   |                                             |                        | Whole wheat Maria biscuits 200 g    |                               |
| Selection of Iberian sausage 100 g | Ham 100 g                                        |                                                   |                                             |                        | Whole wheat Maria biscuits 200 g    |                               |
| Sobrasada 250 g                |                                                      |                                                   |                                             |                        | Whole wheat Maria biscuits 200 g    |                               |
| **General food**               |                                                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
| Salted popcorn 18 g            | Potato crisps 30 g                                   |                                                   |                                             |                        | Chocolate filled biscuits 180 g      |                               |
| Chocolate cream 500 g          | Cupcakes 150 g                                       |                                             |                                             |                        | Sugar free white bread 300 g        |                               |
| Whole wheat Maria biscuits 200 g | Intense flavour olive oil 1 L                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
| Gluten free white bread 300 g  | Gazpacho 390 g                                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
| Dates 200 g                    | Chocolate filled biscuits 180 g                     |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
| Cough sweets 150 g             | Trail mix 120 g                                     |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
|                               |                                                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
|                               |                                                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
|                               |                                                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |
|                               |                                                      |                                                   |                                             |                        | Sugar free white bread 300 g        |                               |

**Note.** CIRE: Centre d’Iniciatives per a la Reinscripción.

On the other hand, there are studies 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 Colombia, families are permitted to bring food into prison for the visits, and are generally typical meals; although in Spain the prison regulations prohibit this practice, 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 authors, may also be beneficial.

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