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ORIGINAL ARTICLE

Impact of kitchen organization on oral intake of malnourished inpatients: A two-center study

Alicia Calleja-Fernández[a,b,*], Cristina Velasco-Gimeno[c], Alfonso Vidal-Casariego[a], Begoña Pintor-de-la-Maza[a], Laura Frías-Soriano[c], Rocío Villar-Taibo[a], Pilar García-Peris[c], Isidoro Cano-Rodríguez[a], Camino García-Fernández[b], María D. Ballesteros-Pomar[a]

[a] *Clinical Nutrition and Dietetics Unit, Department of Endocrinology and Nutrition, Complejo Asistencial Universitario de León, León, Spain*
[b] *Department of Food Hygiene and Technology, University of León, León, Spain*
[c] *Clinical Nutrition and Dietetics Unit, Hospital General Universitario Gregorio Marañón, Madrid, Spain*

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KEYWORDS
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Abstract
Aim: To determine the impact of the type of hospital kitchen on the dietary intake of patients.
Methods: A cross-sectional, two-centre study, of cooking in a traditional kitchen (TK) and in a chilled kitchen (CK). Subjective global assessment (SGA) was used for nutritional diagnosis. Before study start, a dietician performed a nutritional assessment of the menus of each hospital. All dishes were weighed upon arrival to the ward and at the end of the meal.
Results: 201 and 41 patients from the centres with TK and CK respectively were evaluated. Prevalence of malnutrition risk was 50.2% at the hospital with TK and 48.8% at the hospital with CK ($p = 0.328$). Forty-eight and 56 dishes were nutritionally evaluated at the hospitals with TK and CK respectively. Intake analysis consisted of 1993 and 846 evaluations in the hospitals with TK and CK respectively. Median food consumption was 76.83% at the hospital with TK (IQR 45.76%) and 83.43% (IQR 40.49%) at the hospital with CK ($p < 0.001$). Based on the prevalence of malnutrition, a higher protein and energy intake was seen in malnourished patients from the CK as compared to the TK hospital, but differences were not significant after adjustment for other factors.
Conclusions: Cooking in a chilled kitchen, as compared to a traditional kitchen, may increase energy and protein intake in hospitalized patients, which is particularly beneficial for malnourished patients.

* Corresponding author.
E-mail address: calleja.alicia@gmail.com (A. Calleja-Fernández).

PALABRAS CLAVE
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Impacto de la organización de la cocina hospitalaria en la ingesta del paciente malnutrido: estudio de dos centros

Resumen
Objetivo: Determinar el impacto de la organización de la cocina hospitalaria en la ingesta dietética del paciente hospitalizado.
Metodología: Estudio transversal, realizado en dos centros hospitalarios, uno con cocina tradicional (CT) y otro con cocina en línea fría (CLF). La valoración subjetiva global fue empleada para el diagnóstico nutricional. Una dietista-nutricionista realizó una calibración nutricional de los platos y los menús de cada hospital antes de empezar el estudio. La técnica de valoración de la ingesta fue la pesada de alimentos antes y después de la ingesta, siempre en presencia del paciente.
Resultados: Fueron reclutados 201 pacientes del centro con CT y 41 del CLF. La prevalencia de riesgo de desnutrición fue del 50,2% en el CT y de 48,8% en el CLF ($p = 0,328$). En el CT fueron valorados nutricionalmente 48 platos y 56 del CLF. Respecto al análisis de la ingesta, se realizaron 1.993 registros en el centro CT y 846 en el centro CLF. La mediana de ingesta en el CT fue de 76,83% (RIC 45,76%) y 83,43% (RIC 40,49%) en el CLF ($p < 0,001$). Teniendo en cuenta la prevalencia de malnutrición, se observó una mayor ingesta proteica y energética en pacientes malnutridos en el CLF en comparación con el CT, aunque estas diferencias no fueron significativas tras ajustarlas a diferentes factores de confusión.
Conclusiones: Cocinar en una cocina en línea fría podría mejorar la ingesta calórica y proteica del paciente hospitalizado, especialmente en pacientes malnutridos.

Introduction

The importance of food for patients in hospitals has recently been recognized, and its preparation has emerged as a tool to improve healing. Nutritional support minimizes comorbidities and helps to decrease the length of hospital stays.[1]

Several studies have shown there is high prevalence of malnutrition (30–50%) in hospitals.[2–4] This fact, together with patients' altered sensory perceptions, has an impact on their intake. To work towards increasing the dietary intake of patients at risk for malnutrition, a study conducted by Sorensen et al. in 2012 reviewed the sensory quality of hospital food, assessing the appearance, the aroma, the texture and the flavour. They found hospital patients have the need to choose foods that are better tolerated, and there was a large group of patients who informed that the menus were monotonous; a greater variability in the menu could imply an increased intake.[5] Also, the temperature at which the food is eaten by inpatients should play an important role in its consumption.[6]

To provide nutritionally complete hospital menus dieticians need to know the general nutritional requirements of inpatients to calibrate diets, which should include an appropriate distribution of macronutrients. When this is not possible, the recommendations of the Spanish Society of Community Nutrition (SENC) could be followed. General recommendations suggest that standard menus should provide between 2200 and 2400 kcal with 50–55% carbohydrate, 30–35% lipid and 15–20% protein. Therapeutic menus that will be part of the hospital diet handbook should be calibrated with this standard guideline and recommendations based on scientific evidence.[7]

The hospital kitchen is the place where food products are stored, prepared, and cooked. How food is prepared is an important part of patients' acceptance of hospital meals. When managing a hospital kitchen (whether run by hospital employees or staff from a privately run company with a full-service concession of kitchen service, production and distribution), the characteristics of the centre and the kitchen should be taken into account. Finally, it should be known that work schedule of staff will affect the timetable of the patient intake.[8]

With regard to the distribution method, the traditional kitchen (TK) system is based on the production and subsequent retention of products cooked at high temperatures until they are distributed and consumed. This main advantage of this process is the possibility to greatly vary cooking techniques and to reduce costs of the infrastructure; the disadvantages are low levels of food security if proper temperatures are not maintained, the high cost of personnel (running mornings and afternoons shifts of food production from Monday to Sunday) and trouble occurring during peak hours of distribution.

Furthermore, cooking in a chilled kitchen (CK) utilizes a set of kitchen production systems for communities that have the ability to defer time and space, extending the moments between production and consumption. It has significant advantages; high levels of food security, great variety of traditional dishes, preservation of sensory and nutritional qualities of food, proper menu-planning to manage the time gap between preparation of food and its consumption, removal of peak hours of distribution and its contingencies, and reduction of costs. The main disadvantages are the high investment required (for blast chillers and food cart