

Malnutrition in institutionalized and community-dwelling older adults in Spain: estimates of its costs to the National Health System

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INTRODUCTION

- The **prevalence of malnutrition** in older adults varies according to the setting (institution, community, hospital), the diagnostic method and population heterogeneity¹. In Spain, the prevalence of malnutrition, assessed by the Mini Nutritional Assessment (MNA[®]), is **20.8%** (95% CI: 6-62) in **institutionalized older adults** and **6.9%** (95% CI: 0-16,6) in **community-dwelling older adults**¹.
- It is known that malnourished older adult hospital patients use more medical resources than well-nourished patients².

OBJECTIVES

- To estimate the **economic impact of malnutrition on annual direct cost in Spanish institutionalized or community-dwelling older adults**.

METHODS

A **systematic review** was carried out on the economic burden and use of medical resources associated with malnutrition in institutionalized or community-dwelling older adults. National and international databases were searched up to December 2013.

Based on the literature review's results, an Excel-based tool was developed to **estimate the annual cost difference between malnourished and well-nourished institutionalized and community-dwelling older adults in Spain**.

The main inputs considered in the model were:

- Population:** malnourished and well-nourished institutionalized or community-dwelling Spanish older adults (Table 1).
- Resource use:** Annual frequency of general practitioner (GP) visits and hospitalization in each population (Table 2).
- Unit costs** derived from healthcare databases available in Spain (Euros, 2014).

One-way sensitivity analysis (OWSA) was performed to evaluate the effect of varying individually the model inputs between maximum and minimum values based on published data (malnourished/well-nourished prevalence¹; resource use frequency⁵), or if unavailable, the CI 95% was assumed to be 25% (institutionalized/community dwelling older adults prevalence).

Table 1: Population

POPULATION	Data	Calculation	Source
Spanish older adults ≥ 65 years (2014)	8,344,946	--	3
Institutionalized older adults:	4.5%	375,523	4
Malnourished institutionalized older adults	14.6%	54,669	1*
Well-nourished institutionalized older adults	39.0%	146,541	1*
Community-dwelling older adults:	95.5%	7,969,423	Assumed
Malnourished community-dwelling older adults	4.2%	335,169	1*
Well-nourished community-dwelling older adults	68.9%	5,490,911	1*

* Data calculated from source

Table 2: Resource use

RESOURCES	Malnourished	Well-nourished	Source
GP visits per patient/year (n)	37.8	18.2	5
Hospital admissions per patient/year (n)	0.5	0.2	5
Mean length of hospital stay (days)	12.5	6.5	5

RESULTS

SYSTEMATIC REVIEW

Of the **1,105 publications identified**, 1,059 were duplications and irrelevant publications based on title/abstract, 46 were retrieved for full text reading and 37 were excluded. In the end, **9 publications were selected**.

All studies estimated direct costs (National Health System perspective). Design varied considerably between studies (Table 3).

Table 3: Methodological characteristics of the selected publications

Author, year	Design	Population	Objective
Freijer et al., 2013 ⁶ Holland	Cost of illness	Community (home) or institutionalized	To calculate the total additional costs of disease-related malnutrition (DRM).
Freijer et al., 2012 ⁷ Holland	Economic evaluation	Community (home assistance) or institutionalized	To assess the economic impact on the national healthcare budget of using oral nutritional supplements (ONS) for the treatment of DRM.
Meijers et al., 2012 ⁸ Holland	Cost of illness	Institutionalized	To determine the economic implications of malnutrition in nursing homes.
Rice et al., 2012 ⁹ Ireland	Cost of illness	In-patient, out-patient, home or institutionalized	To establish the annual public expenditure arising from the health and social care of patients with DRM.
Lorefält et al., 2011 ¹⁰ Sweden	Observational, prospective, cohort study	Institutionalized	To study the effect of individualized meals on nutritional status, to compare the results with a control group and to estimate direct healthcare costs for both groups.
Guest et al., 2011 ⁵ UK	Observational, retrospective cohort study	Community (home) or institutionalized	To examine the resource and cost implications associated with malnutrition.
Kilonzo et al., 2007 ¹¹ UK	Economic evaluation	Community (home) or institutionalized	To assess the relative efficiency of multivitamin and mineral supplementation compared with no supplementation.
Edington et al., 2004 ¹² UK	Randomized, open-label clinical trial	Community (home)	To determine if nutritional supplementation after discharge from hospital improved nutritional status and functional outcomes or reduced health-care costs.
Arnaud-Battandier et al., 2004 ¹³ France	Observational, prospective cohort study	Community (home or institutionalized)	To assess the cost of malnutrition and related comorbidities and to determine the impact of nutritional support practice on these outcomes.

The results of the systematic review showed that **malnutrition entails higher medical costs in the study population**, particularly due to the length of hospital stay, number of hospital admissions and GP visits.

COST ESTIMATION

The results showed that the annual cost associated with the use of resources of a malnourished patient was 3.5 times higher than that of a well-nourished patient.

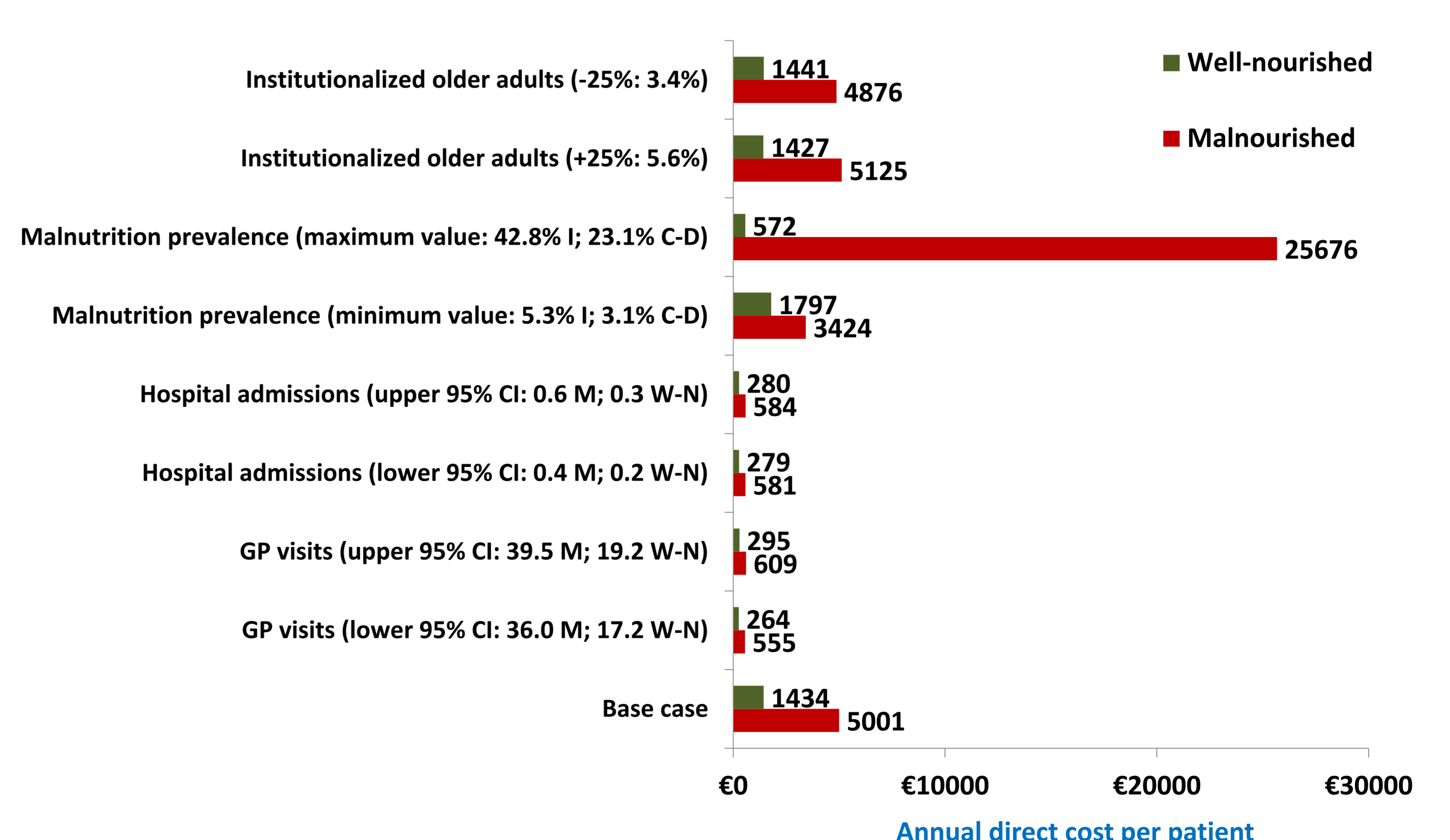
Table 4: Cost estimation results

COST TYPE	Annual cost (€)		
	Malnourished	Well-nourished	Difference
GP visits	224,604,332	1,567,291,058	-1,342,686,726
Hospital admissions	1,724,842,708	6,515,548,848	-4,790,706,141
Total cost	1,949,447,039	8,082,839,906	-6,133,392,867
Total cost per patient	5,001	1,434	3,567

OWSA

The OWSA showed that prevalence of malnutrition was the variable with the greatest impact on results. **Decreasing the prevalence of malnutrition**, according to minimum values identified in the literature, **caused the annual cost per patient with malnutrition to drop from €5,001 to €3,424**, while **increasing it to the maximum** saw a rise from **€5,001 to €25,676** in the annual cost per patient.

Figure 1: OWSA results



CONCLUSIONS

Adopting measures to reduce the prevalence of malnutrition in institutionalized or community-dwelling older adults would reduce the annual cost per patient associated with GP visits and hospitalizations by up to 30%.

1. Millà R, et al. 2012;139:502-508; 2. Medical Nutrition International Industry (MNI). Belgium, 2012; 3. Spanish National Statistics Institute. Available at: www.ine.es [March, 2014]; 4. IMSERSO 2011. Spanish Ministry of Health, Social Services and Equality. December 2011; 5. Guest JF, et al. Clin Nutr. 2011;30:422-429; 6. Freijer K, et al. Clin Nutr. 2013;32:136-41; 7. Freijer K, et al. Pharmacol. 2012;3:78; 8. Meijers JMM, et al. Clin Nutr. 2012; 31:65-8; 9. Rice N, et al. Public Health Nutr. 2012;15:1966-72; 10. Lorefält B, et al. J Nutr Health Aging. 2011;15:92-7; 11. Kilonzo MM, et al. Clinical Nutrition. 2007;26:364-70; 12. Edington J, et al. Clinical Nutrition. 2004;23:195-204; 13. Arnaud-Battandier F, et al. Clin Nutr. 2004;23:1096-103.

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