

Abizanda P.¹, Rodríguez-Mañas L.², Barcons N.³, Paz S.⁴

¹Geriatrics Department, Hospital Universitario Nuestra Señora del Perpetuo Socorro, Albacete, Spain; ²Geriatrics Department, Getafe University Hospital, Madrid, Spain; ³Nestlé Health Science, Barcelona; ⁴Outcomes'10, Castellón, Spain.

INTRODUCTION

Malnutrition is associated with a lower quality of life, and increased morbidity, mortality, hospital admissions and readmissions and medical visits¹. **In Spain, 20,8%** (IC 95% 6-62) of the **institutionalized older adults** and **6,9%** (IC 95% 0-16,6) in **community-dwelling older adults** are **malnourish**, assessed by the Mini Nutritional Assessment (MNA®)².

OBJETIVES

The objective was to **appraise the literature on malnutrition costs in institutionalized or community-dwelling older adults**.

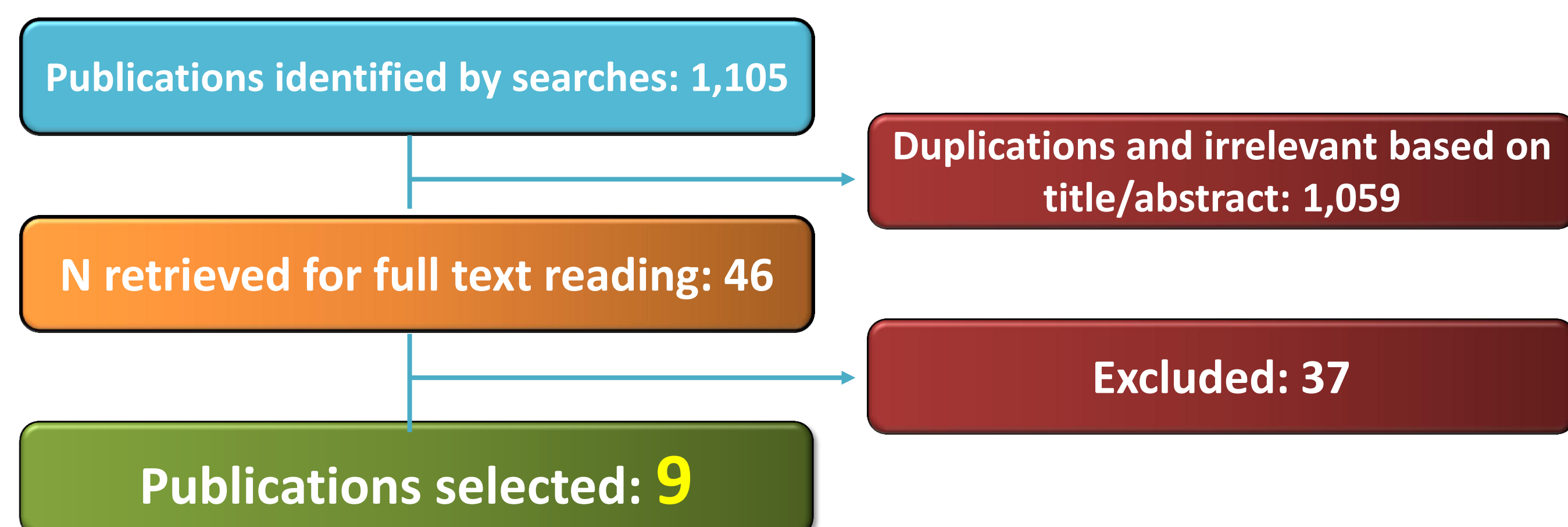
METHODS

A **systematic review** of the literature, **until December 2013**, was carried out by searching **international and national electronic databases** [MedLine/PubMed, Cochrane Library, ISI WOK, SCOPUS, MEDES, IBECS, Google Scholar]. Additionally, bibliographic references were hand searched. Articles on the **economic burden and use of medical resources associated with malnutrition** (or malnutrition risk) in **institutionalized or community-dwelling older adults**, in English or Spanish, were retrieved. All **costs were updated to €**, 2014.

RESULTS

Of the **1,105 publications identified**, a total of **9 accomplished selection criteria**.

Figure 1: Identified and selected publications in the literature review



All studies were European estimating direct costs (National Healthcare System perspective). Design varied considerably between studies (Table 1).

Table 1: Methodological characteristics of the selected publications

Author, year level of evidence	Country	Design	Aim
Freijer et al., 2013 ³ 3B	Holland	Cost of illness	To estimate the annual additional cost of disease-related malnutrition (DRM) in malnourished population in different care settings
Freijer et al., 2012 ⁴ 1A	Holland	Economic evaluation	To evaluate the budget impact of oral nutritional supplements for DRM in community-dwelling older adults
Meijers et al., 2012 ⁵ 4C	Holland	Cost of illness	To determine the economic implications of malnutrition (and risk) in institutionalized patients
Rice et al., 2012 ⁶ 2B	Ireland	Cost of illness	To estimate the resources and cost implications for the health service in DRM patients in different care settings
Lorefält et al., 2011 ⁷ 4C	Sweden	Observational, prospective, cohort study	To study the effect of individualized meals on nutritional status among institutionalized older people and to compare the results with a control group estimating direct healthcare costs for both groups one year after the intervention
Guest et al., 2011 ⁸ 3B	United Kingdom	Observational, retrospective cohort study	To examine the effect of malnutrition on clinical outcomes and healthcare resource use from initial diagnosis
Kilonzo et al., 2007 ⁹ 3B	United Kingdom	Economic evaluation	To assess the relative efficiency of multivitamin and multimineral supplementation compared with no supplementation in institutionalized and community-dwelling older adults
Edington et al., 2004 ¹⁰ 4C	United Kingdom	Randomized, open-label clinical trial	To determine the impact of nutritional supplementation after discharge from hospital over the nutritional status and healthcare costs in older adults
Arnaud-Battandier et al., 2004 ¹¹ 4C	France	Observational, prospective cohort study	To assess the cost of malnutrition and related comorbidities among community-dwelling older adults and to determine the impact of nutritional support practice on these outcomes

Costs associated with malnutrition

- **Freijer et al. (2013)** estimated an additional total cost of disease related malnutrition (DRM) in institutionalized older adults compared with well-nourished ones of € 438 million (0.5% of the Dutch national health expenditure in 2011), explained by an increase on length of hospital stay in malnourished patients.
- **Meijers et al. (2012)** calculated an additional cost corresponding to the management of malnourished institutionalized population (and malnutrition risk) of € 255 million (0.7% of the health expenditure in 2009 in the Netherlands) compared with normal nutrition related to extra efforts in nutritional screening, monitoring and treatment.
- **Rice et al. (2012)** determined the annual total cost of long-term care in institutionalized older patients with DRM at € 689.14 million (6% of the healthcare budget in 2007 in Ireland).
- **Guest et al. (2011)** estimated the cost per malnourished patient during the 6 months after diagnosis in € 2,119.68 (95% CI=€ 1,968.54; € 2,270.83) compared with € 906.88 (95% CI=€ 827.08; € 986.69) in normal nutrition patients, explained by a higher use of healthcare resources in patients with malnutrition (General Practice consultations, hospital admissions and length of hospital stay; p<0.05).

Impact of healthcare interventions on malnutrition costs

- **Freijer et al. (2012)** concluded that the use of oral nutritional supplements (ONS) for the treatment of DRM in community-dwelling older adults reduce the annual total cost of DRM from € 246.644 to € 235.024 million (cost saving: € 11,619.81 million). The additional costs of ONS are balanced due to a re-hospitalization reduction in DRM patients.
- **Lörefält et al. (2011)** estimated the annual direct costs per patient and costs of Primary Care were higher in the intervention group (individualized meals and nutritional education) compared to control group one year after the intervention (€ 830 and € 652 vs. € 760 and € 402). Expenditure of hospital care was zero (€ 0) in the intervention group while in the control group was € 81.
- **Kilonzo et al. (2007)** estimated a higher mean cost per patient in a group receiving nutritional supplements [€ 114.88 (SD=€ 197.85)] compared with a placebo group [€ 95.74 (SD=€ 181.26)] with no significant differences between groups (€ 19.14, CI 95%=-4.79; 44.71).
- **Edington et al. (2004)** observed a significant difference in cost saving between a group receiving nutritional supplements (€ -451.83) a control group (€ -3,736.77, p=0.034). The number of hospital admissions decreased significantly in both (intervention, p=0.0345; control, p=0.0015).
- **Arnaud-Battandier et al. (2004)** calculated the annual cost per patient with high prescription of ONS compared with a low prescription rate group (€ 2,795.53 vs. € 2,593.18, CI 90%=-929, 478). Although the cost associated with the ONS was € 548 higher in the high prescription rate group (CI 90%=496.01, 599.78), the cost of use resources was lower mainly due to hospital admissions (€ 1,631 vs. € 2,203) and medical visits (€ 299 vs. € 462).

CONCLUSIONS

- **Malnutrition implies higher medical costs** in institutionalized or community-dwelling older adults **mainly due to**:
 - Increased rate of hospitalizations,
 - Length of hospital stay and
 - Medical visits.
- **Preventive or therapeutic strategies**, including oral nutritional supplements, **should be considered if better nutritional status and lower medical costs** are sought in this population.

1. Pérez de la Cruz A, et al. Med Clin (Barc). 2004;10:201-6. 2. Milà R, et al. 2012;139:502-508. 3. Freijer K, et al. Clin Nutr. 2013;32:136-41. 4. Freijer K, et al. Pharmacol. 2012;3:78. 5. Meijers JMM, et al. Clin Nutr. 2012; 31:65-8. 6. Rice N, et al. Public Health Nutr. 2012;15:1966-72. 7. Lorefält B, et al. J Nutr Health Aging. 2011;15:92-7. 8. Guest JF, et al. Clin Nutr. 2011;30:422-429. 9. Kilonzo MM, et al. Clinical Nutrition. 2007;26:364-70. 10. Edington J, et al. Clinical Nutrition. 2004;23:195-204. 11. Arnaud-Battandier F, et al. Clin Nutr. 2004;23:1096-103.