



Original article

Efficiency, cost-effectiveness and need of inversion in nutritional therapy. Importance of detecting and documenting undernutrition



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SUMMARY

Disease Related Malnutrition (DRM) is highly prevalent in Spanish hospitals. WHO estimates that 20–40% of health-associated expenses are lost due to inefficiency. Demonstration that DRM is a component of inefficiency and hiring a specialist physician for its detection and treatment is cost-effective.

Material and methods: Comparison between nutritional diagnosis and procedures detected and encoded at discharge using McNemar test. Recoding of 162 discharge reports including nutritional diagnoses and procedures. Determine changes on Case-Mix Index (IC), cost of procedure and cost procedure/DRG index. Comparison using T-student paired test.

Results: Only 10 of 162 diagnoses of malnutrition were coded in delivery statements ($p < 0.001$). After right codification, IC increased in 103,3 DRG points ($p < 0.001$). Consequently, procedure cost/DRG index was reduced in 978.81 € ($p < 0.001$).

Conclusions: DRM is underdiagnosed in our hospital. DRM and nutritional procedures detection by a doctor specialist in clinical nutrition led to a reduction in cost procedure/DRG index of 16.8% of officially established by the Health System. Loss of 16.8% of health expenses, estimated in 424.785,15 € was described. Proper codification would have justified 343.291,2 € reimbursement just for nutritional diagnoses and processes. Both expenses were lost due to system's inefficiency. Those amounts are much higher than cost associated of hiring a specialist in clinical nutrition.

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1. Introduction

The burden of disease related malnutrition (DRM) has been persistently high [1]. Reported frequency in Spain depends on the sample and tools used, but varies between 20 and 70% in hospitalized patients (Table 1) [2–6]. Between them, there is only one nationwide, cross-sectional, observational, multicentre study in routine clinical practice which assessed the prevalence of DRM using NRS-2002© tool, the PREDyCES© study [7]. Its main conclusion was that one in four patients was malnourished (23.7%) in Spanish hospitals. Even more, PREDyCES showed us that

malnourished patients wasted more resources than well-nourished, mainly because of increased length of stay (LOS). Cost of hospitalization were higher between patients with DRM compared to those well-nourished, especially between those who developed DRM during the hospitalization (12237 vs 6408 €). In addition, DRM is associated with higher morbidity and mortality, as competent European organisms have recognized [8,9]. Otherwise, DRM is not properly identified [10], which leaves to a lower Case-Mix Index (CI), and its repercussion can be measured in economic terms [11]. Examples of this were described by Funk [12], Raja (coding of malnutrition increased the complexity of 23% of the patients in the study) [13] and Ockenga (rise of CI from 1,53 to 1.63) [14]. In our country, Álvarez and cols determined the impact of coding malnutrition in a sample of 134 patients; medium CI for 10.421 hospital incomes increased in 0.035 due to proper coding of DRM in the isolated sample [15]. Similar results

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Abbreviations

DRM	disease related malnutrition
CI	case-mix index
DRG	Disease-related group
LOS	Length of stay
NSU	Nutritional Support Units
SES	Servicio Extremeño de Salud
NRS-2002	Nutritional Risk Screening 2002
SGA	Subjective Global Assessment
MNA	Mini Nutritional Assessment
CONUT	Nutritional Control Method
HSPA	San Pedro de Alcántara Hospital
EN	Enteral Nutrition
PN	Parenteral Nutrition
NSA	Nutritional Status Assessment
CHC	Cáceres Hospital Complex
ASPEN	American Society of Parenteral and Enteral Nutrition
WHO	World Health Organization

were obtained by Villalobos and cols, who described that adequate coding of DRM and associated processes (enteral or parenteral nutrition) in his hospital augmented in 5 hundredths the CI (from 1,84 to 1.89) [16]. It is said that between 20 and 40% of health-system's economic cost are lost due to inefficiency [17], and specialized nutritional screening and intervention or specialized nutritional support units (NSU) has been shown to be cost-effective for health systems [14]. Instead of investing in nutritional therapy, our regional government (Gobierno de Extremadura), in its last strategy of health policy has removed the target of creation of specialized nutritional support units (NSU) in regional hospitals [18,19]. As in our country, specialist on Endocrinology and Nutrition are those well-trained in detection and treatment of nutritional support and given the lack of NSU in many hospitals of our region, we consider that employ a specialist in order to develop NSU and perform specialized nutritional interventions can make the local health system (Servicio Extremeño de Salud (SES)) more efficient, reduce loss due to inefficiency and become more cost-effective. For demonstrating our hypothesis, our group performed the following study.

2. Objectives

Determine if detection and treatment of DRM by a specialist in endocrinology and nutrition is able to rise local SES's efficiency, just by justifying at least 10% of economic cost of attendance in patients with DRM compared to those made by non specialist.

Establish if specialist in endocrinology and nutrition are cost-effective for the LHS, meaning cost-effectiveness as lower costs of hiring a specialist compared to quantity of cost justified by diagnosing and treating DRM.

3. Material and methods

3.1. Type of study

An agreement study was performed in real clinical practice conditions.

3.2. Sample size

Considering that proper codification of malnourish and artificial nutrition procedures could justify more than 10% of economic cost of attendance of these patients by increasing CI at least 10% than absence of codification within a closed economic budget; and taking a confidence of 95% and a potency of 80%, an initial sample size of 138 cases in each group was consider to test our hypothesis. In order to increase statistical power, a final sample of 162 patients was studied.

Eligible patients were those admitted at San Pedro de Alcántara Hospital (HSPA) in Cáceres (Spain) in which artificial nutritional treatment was indicated (meaning parenteral (PN) or enteral nutrition (EN)) and malnourished criteria at discharge defined in the ASPEN consensus statement for diagnosis of malnutrition [20]. All patients were older than 18 years old. Patients admitted at pediatrics, obstetrics, and medical or surgical specialties not present at HSPA (geriatrics, ophthalmology, psychiatrics and plastic surgery, ambulatory surgery) were not included in the study.

4. Procedure

From September 2013 to June 2014, a specialist in clinical nutrition performed a nutritional intervention in HSPA. The study was made in real clinical practice situation. Specialized nutritional support started when artificial nutrition was performed or if NSU was asked for it. Screening (with NRS 2002 tool) and nutritional status assessment (NSA) including weight, height (measured with a scale with height rot Seca 769 (Seca gmbh & co. Hammer Steindamm. Hamburg, Germany), BMI, skin folds, and ASPEN recommended method [20] were tested and registered in a database initially. Depending on results and available accesses for nutritional support, a specialized nutritional support plan was prescribed and controlled during its duration. At discharge a new NSA based in ASPEN recommendations was performed; results were also registered in the database. After delivery, compilation of data (sex, age, length of stay (LOS), NSA at discharge and type of nutritional support prescribed (PN or EN) were also collected. Malnourishment was defined as ASPEN consensus statement

Table 1

Results of the economic indicators in the study. CI: Case-Mix Index, RDG: Related Diagnosis Group.

	Patients	Minimum	Maximum	Sum	Median	Interquartile range
Official one day stay cost (€)	162	0.00	2.268,13		701.76	483.16–848.83
Recoded One day stay cost (€)	162	341.35	2.612,72		792.02	607.03–967.64
Official cost of procedure (€)	162	0.00	100.877,04		10.443,16	6.307,37–20.511,91
Recoded cost of procedure (€)	162	506.20	10.2065,85		13.326,695	7.128,18–23.003,08
Total Official cost (€)	162			2,527.670,57		
Total cost after recoding (€)	162			2,870.961,82		
Official CI	162	0.00	14.75	514.06	2,751800	1,3003–3,9811
CI after recoding	162	0,5107	14.75	617.90	3,300450	2,2282–4,1604
Official cost of procedure/RDG point index (€)	162	0.00	2.5086,65		4.480,848733	2.938,85–6.636,93
Recoded cost of procedure/RDG point index (€)	162	0.00	1.6844,00		3.254,153950	2.047,75–5.410,11

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