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Latin American Study on parenteral and enteral nutritional therapy—ELANPE Study ELANPE Group

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ABSTRACT

Objective: We describe the status of medical nutrition therapy in adult patients in several hospitals in Latin America in 2023. with the aim of deepening understanding of its implementation and thus, in turn, contributing to the advancement of future guidelines.
Materials and methods: This is a descriptive, multicenter, cross-sectional study. An electronic questionnaire was applied, containing screening, nutritional therapy, multidisciplinary nutritional support, and monitoring indicators. Descriptive statistics were used in data processing.
Results: A total of 132 hospitals from 14 Latin American countries participated; 68.2% were state-owned with a median of 23,804 patients. In 66% of hospitals (n = 87) nutritional screening is systematically implemented; NRS-2002 (n = 66; 75.9%) applied mostly by dietitians. Median malnutrition at admission was 33% (IQR = 30.8). Median indication for diet therapy was 54.4% (IQR = 44.3); oral supplementation 13.6% (IQR = 18), and enteral and parenteral nutritional support 14.6% (IQR = 10.2). Indication is carried out mostly by dietitians (n = 78; 59.1%). 29.5% (n = 39) of hospitals count on multidisciplinary nutritional support. 75% (n = 99) use industrialized formulas, mostly in closed systems (n = 53; 40.2%). For parenteral nutrition, individually compounded and preprepared solutions are used (n = 71; 53.8%) generally administered by central catheters. Most frequently cited monitoring indicators were hemodynamic instability, metabolic complications, abdominal distension, and gastric residue.
Conclusion: There are still low implementation percentages of nutritional screening, formation of nutritional therapy teams, and use of oral supplements. Malnutrition upon admission is within the expected range.

Introduction

Malnutrition, resulting from inadequate nutrient intake or absorption in relation to disease-related requirements, affects body composition and functions. Current classifications link malnutrition to inflammation [1–4].

NutritionDay, a worldwide initiative aimed to raise awareness on disease-related malnutrition in healthcare institutions, concluded that 1/3 of patients were identified as malnourished or at risk [5]. In the US, around 8.9% of hospital discharges have a documented malnutrition diagnosis [6]. Another study indicated 32.7% [7]. Studies carried out in Latin America established that prevalence of hospital malnutrition has not changed much in recent years (44.9– 50.2%) [8–10].

In-hospital malnutrition leads to longer stays, increased costs, and higher mortality rates [10,11]. The greatest effect of in-hospital mortality was seen when intake was reduced to 25% or less [5].

Considering this data, the need to implement nutritional screening systems is justified and should be generalized in patients upon admission and during hospitalization [12]. Nutritional therapy should be indicated and monitored by multidisciplinary teams. Simon Allison defines a multidisciplinary nutritional support team as one that includes experts from different disciplines who are good communicators and have knowledge of the optimal

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administration of nutritional therapy. This team improves and ensures quality of therapy and reduces healthcare costs by preventing unnecessary interventions [13–16].

Nutrition care process is a systematic method used to provide nutritional care [16,17]. Its use leads to more efficient and effective nutritional care. Globally, there are several initiatives designed to provide guidance and promote high-quality, evidence-based care. Its implementation is based on several guiding principles that can be used as a reference for adoption of workflow options [18,19].

Medical nutrition therapy is a term that encompasses oral nutritional supplements, enteral tube feeding (enteral nutrition), and parenteral nutrition. The latter two have traditionally been referred to as "artificial nutrition," but it is suggested replacing this term with "medical nutrition therapy" [3]. The American Society for Parenteral and Enteral Nutrition (ASPEN) and others have adopted the term Artificially Administered Nutrition and Hydration to refer to the latter two.

Despite all efforts made to reduce high numbers of malnutrition related to disease, such numbers remain high. Therefore, among its initiatives, FELANPE (Federación Latinoamericana de Terapia Nutricional, Nutrición Clínica y Metabolismo) has made two declarations about patients' rights to receive adequate nutrition [13,14].

This study assesses medical nutrition therapy's potential for improvement, offering insights for future research and aiding interdisciplinary teams in enhancing nutrition support practices.

Materials and methods

A descriptive, multicenter, cross-sectional study was conducted in 132 large hospitals across 14 Latin American countries in 2023, excluding gynecological, obstetric, and pediatric facilities. Data collection utilized Google® Form, and sample size estimation considered research design and pilot test results using a calculator [20].

Variables analyzed were general characteristics of the hospital, nutritional assessment, nutritional diagnosis, nutritional intervention, and monitoring of nutritional therapy.

Data was exported to an Excel form and processed using SPSS (Statistical Package for Social Sciences) Software version 21®. The normality of data was assessed using the Kolmogorov–Smirnov test. Quantitative data were presented as mean and standard deviation (SD), while non-normally distributed quantitative data were presented as median and interquartile range (IQR). To mitigate biases and maintain precision, outlier detection was performed using the interquartile range, eliminating data points falling within the 0 to 10 and 90 to 100 percentiles.

Research protocol was approved by UNA (Code 974/2023 of 04/21/2023), and FELANPE (Maiz, A on 20/05/2023).

Results

We enrolled 132 hospitals; 134 hospitals were eligible and 2 were excluded (Fig. 1).

Most hospitals are state-owned (n = 90; 68.2%). Median total bed capacity was 209 (IQR = 251) with a median occupancy percentage of 84.4% (IQR = 23), which corresponds to an approximate of 23,804 patients (occupied beds). Only 87 hospitals reporting systematic nutritional screening upon admission were included for the analysis of malnutrition and nutritional intervention.

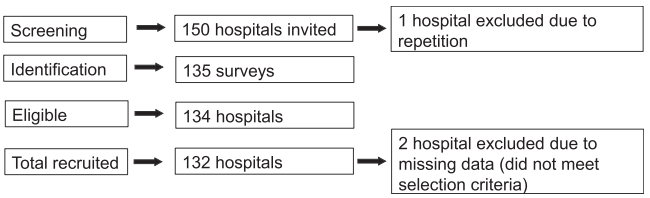

Fig. 1. Study flow chart.

In 87 of 132 hospitals (15,346 patients) diagnosis of malnutrition risk was made upon admission within the first 72 hours using some screening tool. Median malnutrition was 33% (5,064 patients; IQR = 30.8). Differentiating by services, median malnutrition in medical patients was 29% (n = 85; IQR = 33), in surgical patients 30.3% (n = 70; IQR = 27.1%), and in critically ill patients 35.5% (n = 83; IQR = 34).

Screening tools perform systematically in 65.6% (n = 87) of hospitals, which found a median of 24% of malnutrition. Most used tools were NRS 2002 (n = 66; 75.9%) and NUTRIC Score (n = 16; 18.4%). The dietitian is the specialist who most frequently applies the nutritional screening tool (n = 67; 77%), and the nutritional therapy (n = 78; 59.1%).

Regarding tools and components for nutritional screening and diagnosis, in most hospitals studied, these are implemented in a combined manner. Most used are anthropometry (n = 87; 65.9%) and SGA (n = 71; 53.8%).

Inquiring about nutritional intervention, median and interquartile ranges of percentages of use of different nutritional interventions were calculated in relation to the total number of patients hospitalized at the time of the study.

Results showed that median indication for diet therapy was 54.4% (IQR = 44.3), oral nutrition supplement 14.9% (IQR = 18), and enteral and parenteral nutritional support 14.6% (IQR = 10.2).

Enteral nutritional support through feeding tubes was implemented at 8.7% (IQR = 10.4), enteral nutritional support through ostomies at 2.3% (IQR = 2.8), and parenteral nutritional support at 3.4% (IQR = 2.7) (Table 1).

Only 29.5% (n = 39) reported having a nutritional therapy team. Median number of team personnel is 2 specialists. Most lacking team members are pharmaceutical chemists (n = 47; 35.6%) and nursing (n = 47; 35.6%).

Most frequent enteral nutrition monitoring indicators were hemodynamic instability, nausea, vomiting, and abdominal distention. For parenteral nutrition, monitoring indicators are hemodynamic instability, catheter infection, and metabolic complications.

Discussion

In the present study, 2/3 of hospitals systematically implemented nutritional screening methods upon admission; like results in a study (52%) [21]. In 2001, less than 20% of patients' records included nutritional status information [22]. Application of nutritional screening upon admission leads to better patient identification of at risk for malnutrition and therefore to better nutritional treatment [6]. Most used tool referred to in this study is NRS 2002 as shown in the European study [21]. It is a strong independent risk indicator for mortality related to malnutrition, reliable,

Table 1
Percentage of nutritional intervention (n = 129)

Nutritional medical therapy	Mean	Median	SD	Min	Max	IQR
ONS	11.6	14.9	6.2	0	74.3	18.5
EN tube feeding	10.1	8.7	7.7	0	36.4	10.4
EN ostomies	1.9	2.3	1.2	0	15.3	2.8
Parenteral nutrition (TPN and PPN)	2.2	3.4	1.4	0	30.9	2.7

ONS: Oral Nutritional Supplement, NGT: Nasogastric Tube, EN: Enteral Nutrition, ENS: Enteral Nutritional Support, TPN: Total Parenteral Nutrition, PPN: Peripheral Parenteral Nutrition, IQR: interquartile range.

A higher percentage reported they exclusively use industrialized formulas (n = 99; 75%). Closed system is the most used (n = 53; 40.2%) (Table 2). Seventy hospitals (51.9%) have place and staff for preparation of nutritional formulas.

Table 2
Types of formulas and systems used for enteral nutritional therapy (n = 132)

		n	%
Type of formulas	Commercial only	99	75
	Exclusively blended food for enteral feeding	1	0.8
	Industrialized and blended food for enteral feeding	31	23.6
	Do not know/do not answer	1	0.8
Systems	Open	39	29.5
	Closed	53	40.2
	Open and closed	40	30.3

On the other hand, premixed parenteral and individually compounded solutions in combination are most used (n = 71; 53.8%), and central catheter is the most referred for implementation of parenteral nutrition (n = 128; 97%) (Table 3).

validated in several randomized controlled trials [23–26], and recommended by scientific societies [27–29].

Anthropometry and SGA are commonly used methods, with SGA considered a gold standard tool, especially in Latin America [30,31]. Despite this, ESPEN (European Society for Clinical Nutrition and Metabolism) recommends a comprehensive clinical assessment until a specific tool is validated [32]. Currently, there is no universally accepted method for diagnosing malnutrition [33]. No hospital reported using advanced nutritional body composition evaluations, which are recommended methods [34–36].

GLIM (Global Leadership Initiative on Malnutrition) criteria were used by only 30% of hospitals. Studies show that it was applied heterogeneously with varying malnutrition prevalence and nearly 50% of studies applied all criteria. It is possible that the poor utilization of this tool is related to lack of awareness [37–39].

Malnutrition results found in the present study are similar to nutritionDay [5]. However, the prevalence of malnutrition at admission was lower than that described in other reports from Latin America [8,9]. This difference could be due to the fact that secondary data was used and only patients admitted within 72 hours prior to admission were included. Differentiating by services it was found that median malnutrition in surgical patients was 30.3% (IQR = 27.1), and in critically ill patients 35.5% (IQR = 34). Compared to a review, prevalence of malnutrition in surgical patients was very variable (10.2–66%), and in critically ill patients was 54%. Variety of nutritional assessment instruments used upon admission could also be evidenced [10].

Thirty percent of hospitals reported having nutritional therapy teams similar to a study published in 2022. Related causes are lack of interest of health specialists and lack of budgets allocated for nutritional support [17]. Results found in this study are alarming and do not comply with the provisions of the Cartagena Declaration, an international instrument that promotes through 13 principles, the right to nutritional care and the fight against malnutrition [14]. Multidisciplinary nutritional support has a positive effect on mortality and quality of life [40].

Table 3
Types of parenteral solutions and catheters used for parenteral nutrition therapy (n = 132)

		n	%
Parenteral solutions used	Premixed parenteral solutions	32	24.2
	Individually compounded solutions	28	21.2
	Elaborated and individually compounded TPN solutions	71	53.8
	Do not use TPN	1	0.8
Catheters used	Central	128	97.0
	Peripheral	66	50.0
	PICC	56	42.4
	Temporary	32	24.2
	Extended	22	16.7

PICC: Peripherally Inserted Central Catheter, TPN: Total Parenteral Nutrition.

As found in this study, the dietitian is the specialist who is mainly in charge of nutritional evaluation and prescription. Current guidelines establish that dietitians are the ones who primarily assume leadership in coordinating nutritional care during hospital stay and later during follow-up [41]. The limitation of pharmaceutical chemists is striking. They are essential members of the team [42].

Diet therapy was the most indicated nutritional intervention. Oral nutrition supplements were lower than other studies [43]. NutritionDay showed an increased use to 45% [5]. Evidence recommends it because it is a cost-beneficial intervention strategy [44,45]. Use of enteral and parenteral nutritional support figures are similar to those found in nutritionDay [5] where it was used in 17% of patients in general and in 10% of critical patients.

High percentage of hospitals use commercial nutritional formulas especially by closed systems, figures different from those found in a study carried out in areas with limited resources [46]. Therefore, it could be noted that the results found in our study are in line with the recommendations [47,48].

Parenteral nutrition implementation was similar to other studies. Lower values are to be expected in relation to enteral nutrition since this feeding means is always prioritized [49]. Although in the present study the highest percentage reported using TPN individually compounded and premixed solutions, studies show a trend in the reduction in the use of personalized or individually compounded parenteral solutions, and an increase in the use of commercial solutions [50,51].

It was possible to see that few hospitals count on a well-defined system of implementation of the entire nutritional care process. Several studies strongly support the concept of systematically screening inpatients upon hospital admission for nutritional risk, regardless of their medical condition, followed by nutritional assessment, and introduction of individualized nutritional support in at-risk patients [52–57].

Limitations of the study could be the low representativeness by country, and the sample type. Only some hospitals defined by criteria participated not following a random sampling, added to the fact that possibly only hospitals that are in better conditions agreed to participate.

Future directions

Future studies should aim for representative sample sizes and utilize random sampling methods, with data collection ideally conducted directly by researchers. Considering the findings, it is advisable to establish unified quality-of-care evaluation indicators across Latin America, drawing from global initiatives' experiences for guidance.

Conclusion

A relatively low percentage of hospitals systematically implement certain screening tools, with NRS-2002, NUTRIC Score, anthropometry, and SGA being the most referenced. Nutritional evaluation and support are primarily conducted by nutritionists. Malnutrition prevalence upon admission appears lower compared to other Latin American reports.

Diet therapy is the most frequent intervention, followed by enteral nutrition. However, few hospitals have dedicated nutritional therapy teams, with pharmacists being notably scarce. Monitoring indicators mainly focus on hemodynamic instability,

metabolic complications, catheter infection, as well as nausea, distention, and increased gastric residue.

This study highlights areas for improvement in nutritional medical therapy, particularly in team formation and evaluation. To address these findings, promoting education and implementing strategies for continuous improvement in nutritional therapy across Latin American countries are essential.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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A. Ferreira Heyn: Writing – review & editing, Visualization, Supervision, Project administration, Methodology, Investigation, Data curation, Conceptualization. **C. Bordón Riveros:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation. **M. Morínigo Martínez:** Methodology, Investigation, Formal analysis, Data curation. **L. Elizeche Serra:** Validation, Supervision, Project administration, Investigation. **L. Ibarra Samudio:** Validation, Supervision, Project administration, Investigation. **A. Aguilar-Rabito:** Writing – review & editing. **M.E. Goiburú Martinetti:** Writing – review & editing. **A. C. Campos:** Visualization, Validation, Supervision, Methodology, Investigation, Conceptualization. **G. Kliger:** Visualization, Validation, Supervision, Methodology, Investigation, Conceptualization. **A. Miján de la Torre:** Visualization, Validation, Supervision, Methodology, Investigation, Data curation, Conceptualization. **M. Perman:** Visualization, Validation, Supervision, Methodology, Investigation, Conceptualization. **N. Velasco:** Visualization, Validation, Supervision, Methodology, Investigation, Conceptualization. **R. Figueredo Grijalba:** Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Conceptualization.

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The opinions expressed in this document are solely the responsibility of the authors and do not necessarily reflect the criteria or policy of the scientific journal.

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Participating hospitals

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