

# Quality indicators in enteral nutrition therapy at a university hospital

*Indicadores de qualidade em terapia nutricional enteral em um hospital universitário*

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## ABSTRACT

**Introduction:** Quality indicators for nutrition therapy (QINT) are tools which serve to evaluate the quality of enteral nutrition therapy, useful for indicating possible failures in carrying out tasks and identifying data. They allow to establish a strategy to improve the nutritional assistance service.

**Objective:** To apply the indicators for enteral nutrition therapy at a university hospital in Sergipe.

**Methods:** A cross-sectional and retrospective study, by analyzing the records of patients undergoing a closed nutrition therapy (NT) system at a university hospital in Sergipe and applying quality indicators for nutrition therapy. One hundred and twenty (120) medical records were evaluated, comprising 63.3% from the medical clinic (MC) and 36.7% from the intensive treatment unit (ITU). The sample was formed of 44.2% females and 55.8% males, with an average age of  $62.9 \pm 20.1$  years. **Results:** The clinical diagnosis increased for pulmonary diseases, sepsis and CVA. It was observed that the QINT which were shown to be adequate in a minimum of one of the months analyzed were only: fasting time, diarrhoea, constipation, withdrawal of the feeding tube and glycemic change. **Conclusion:** The results found reflect the way the service is organized, and therefore the application of quality indicators should be considered, since it is a viable alternative and easy to use. From the critical points revealed, the quality indicators allow corrective and preventive action to be carried out for effective NT in the hospital.

## RESUMO

**Introdução:** Os indicadores de qualidade em terapia nutricional (IQTN) são ferramentas que servem para avaliar na qualidade da terapia nutricional enteral, sendo útil para o apontamento de possíveis falhas na execução de tarefas, identificando dados que permitem o estabelecimento de estratégia para melhoria do serviço de assistência nutricional. **Objetivo:** Aplicar indicadores de terapia nutricional enteral (IQTN) em um hospital universitário de Sergipe. **Método:** Trata-se de um estudo transversal e retrospectivo, através da análise de prontuários de pacientes em terapia nutricional (TN) em sistema fechado em um Hospital Universitário de Sergipe e aplicação de indicadores de qualidade em terapia nutricional. Foram avaliados 120 prontuários, sendo 63,3% da clínica médica e 36,7% da UTI. A amostra foi representada por 44,2% do sexo feminino e 55,8% masculino, com média de idade de  $62,9 \pm 20,1$  anos. **Resultados:** O diagnóstico clínico foi crescente para doenças pulmonares, sepse e AVC. Observou-se que os IQTN que apresentaram adequação em, pelo menos, um dos meses analisados foram apenas: tempo de jejum, diarreia, constipação, saída da sonda e alteração glicêmica. **Conclusão:** Os resultados encontrados refletem a maneira como está organizado o serviço, sendo assim, a aplicação de indicadores de qualidade deve ser considerada, já que se trata de uma alternativa viável, pois tem fácil aplicabilidade e a partir dos pontos críticos encontrados permite que sejam feitas ações corretivas e preventivas para efetividade da TN no hospital.

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## INTRODUCTION

Enteral nutrition therapy (ENT) is a therapeutic tool, which provides nutritional support to individuals who are unable to eat. It has been used to improve the nutritional conditions of hospitalized patients, offering the appropriate nutritional support which meets their needs and contributes towards maintaining and/or retrieving their nutritional state, associated with a significant impact on these patients' clinical progress<sup>1</sup>.

Hospitalized patients present a greater nutritional risk, since in some cases they are hospitalized with malnutrition, while others become undernourished during their stay<sup>2</sup>. Appropriate nutrition may contribute towards reducing complications associated to the disease, time of hospitalization, improving treatment results, reducing hospital costs and mortalities. Routine monitoring of nutritional provision is fundamental for efficient therapy and, consequently, to improve care<sup>1,3</sup>.

Quality indicators for nutrition therapy (QINT) are tools used to guarantee efficient daily routines, reducing costs, further analysis of processes, better clinical results and quality of life for individuals. They serve as evaluative instruments for ENT quality, useful for indicating possible failures in carrying out tasks and identifying data, which allows the establishment of a strategy to improve the nutritional assistance service<sup>3,4</sup>.

Since the hospital only recently became a university hospital, the need for evaluation and planning to introduce new services is of the utmost importance. A lack of clinical dieticians who meet the demands of the service, and the absence of protocols and registers of information on nutrition therapy in the records, among other factors, were also found. Thus, this research sought to apply QINT to perform a critical analysis and evaluation of the adequacy of the nutritional assistance provided by the service, with a view towards creating action plans and improvements, and corrective and preventive actions for effective nutrition therapy. In this context, this study has the aim of applying QINT at a university hospital in Sergipe.

## METHODS

It is a cross-sectional and retrospective study, through analysis of patient records indicated for ENT, admitted into the medical clinic (MC) and Intensive Care Unit (ICU) of a university hospital in Sergipe, in the municipality of Lagarto, during the period between January and August 2017. Hospital management was carried out exclusively by the old administration at this time, under concession from the State of Sergipe.

One hundred and twenty (120) records were analyzed, including patients exclusively in a closed ENT system for a minimum of 72 hours, aged 18 and over and of both sexes.

A standardized and pre-coded questionnaire was used for data collection, related to patients' clinical and nutritional information, noted on the records by the dieticians and

professionals from the team responsible for patient follow-up. The medical diagnosis was considered for the clinical data and the body mass index (BMI) evaluated as a nutritional parameter.

The QINT adopted for this research were: 1) Frequency of carrying out nutritional screening within the first 72 hours of admission; 2) frequency of BMI measurement; 3) frequency of measuring or estimating energy expended and protein requirements in nutrition therapy (NT) patients; 4) frequency of diarrhoeal episodes in ENT patients; 5) frequency of episodes of constipation in ENT patients; 6) frequency of patients with a calorie intake of between 25 and 40 kcal/kg/day; 7) frequency of glycemic changes in ENT patients; 8) frequency of > 24-hour fasting in ENT patients; 9) frequency of involuntary withdrawal of the enteral feeding tube in ENT patients.

The Statistical Package for Social Sciences (SPSS) program, version 20.0 was used for data analysis, to perform the descriptive analysis. Adapted formulae proposed by ILSI Brazil<sup>5</sup> were applied at a later date. The graphs were created using Microsoft® Excel 2007.

The Federal University of Sergipe Ethical Research Committee approved this research with report N° 2.394.267, in line with National Health Council Resolution N° 466/2013.

## RESULTS

The majority of the patients evaluated were admitted in MC. Of the total sample, 55.8% were men and the mean age was  $62.9 \pm 20.1$  years. The most frequent clinical diagnoses were pulmonary diseases (18.3%), CVA (17.5%) and sepsis (13.3%) (Table 1).

In accordance with QINT, it was observed that not all the indicators evaluated suggested adequacy equal or above the recommended target. It is highlighted that the nutritional screening indicator suggested the greatest inadequacy (Figure 1a), carried out only in February and May and >24-hour fasting only reached the recommended target in May, with no records of over 24-hours of fasting that month (Figure 1e).

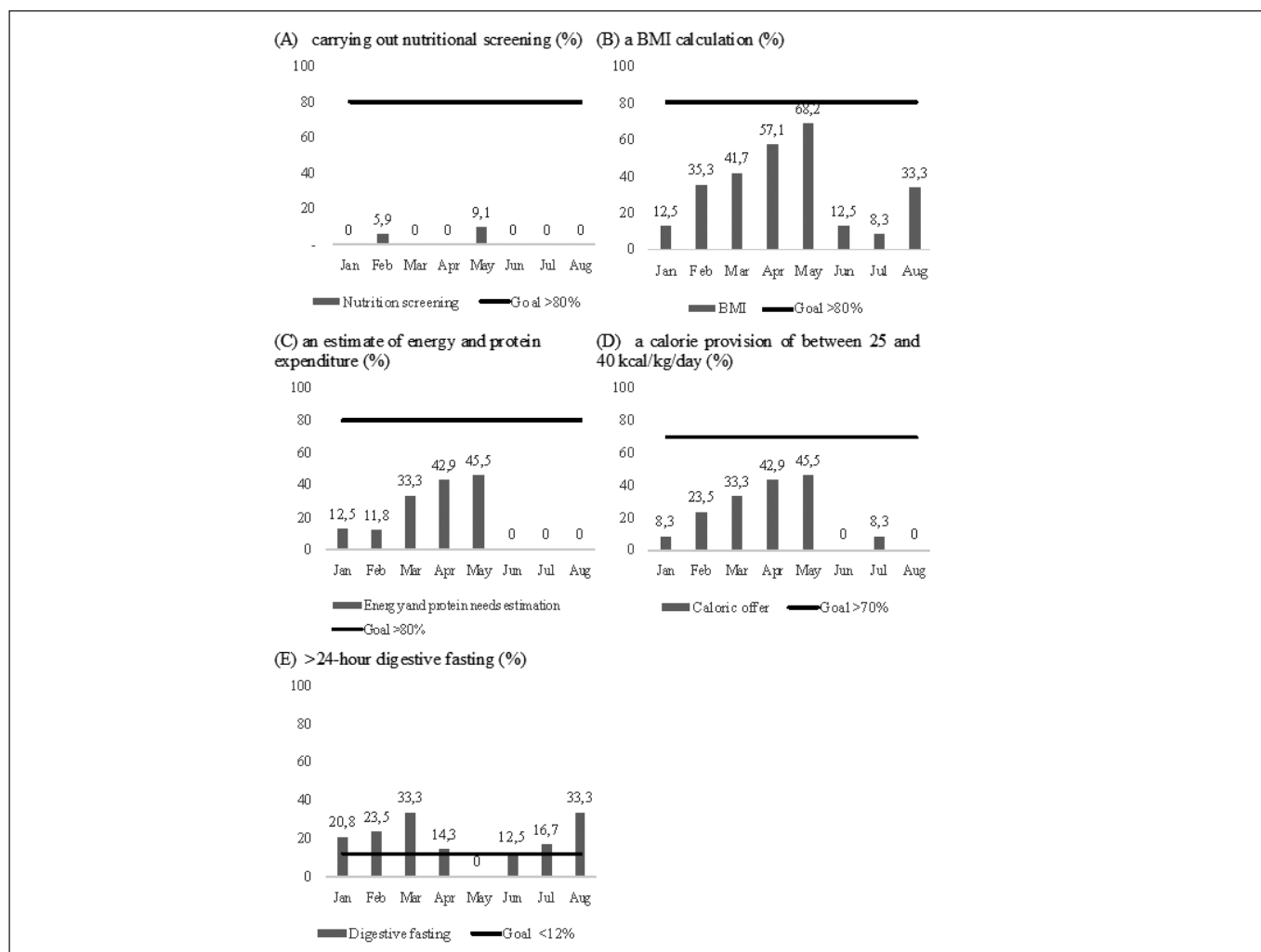
In relation to the complications associated to NT, only the feeding tube withdrawal indicator proved to be inadequate in relation to the recommended target in four of the months evaluated, while the other indicators suggested adequacy in only one month (Figure 2c). It is noted that the constipation indicator suggested the greatest inadequacy, rising to 66.6% in January (Figure 2b).

The results of glycemic change, in line with the sectors researched (MC and UTI) are presented in figures 3a and 3b. It was noted that the glycemic change was inadequate every month in MC (Figure 3a), reaching 100% in June. In ITU, it was observed that the values were only within the target in January, February and May. Records of patients admitted in the sector during the period evaluated were not available for August.

**Table 1** – Characterization of patients using ENT admitted at a university hospital in Sergipe.

Variables	MC	ICU	Total
	n (%)	n (%)	n (%)
<b>Gender</b>			
Female	31 (25.8)	22 (18.3)	53 (44.1)
Male	45 (37.5)	22 (18.3)	67 (55.8)
<b>Age group</b>			
Adults	21 (17.5)	28 (23.3)	49 (40.8)
Elderly	55 (45.8)	16 (13.3)	71 (59.2)
<b>Clinical diagnosis</b>			
Pulmonary diseases	13 (10.8)	9 (7.5)	22 (18.3)
CVA	21 (17.5)	0 (0.0)	21 (17.5)
Sepsis	7 (5.8)	9 (7.5)	16 (13.3)
<b>Form of feeding</b>			
Nasoenteral tube	70 (58.3)	43 (35.8)	113 (94.1)
Gastrostomy	6 (5.0)	1 (0.8)	7 (5.8)

CVA=Cerebrovascular Accident; MC=Medical Clinic; ICU=Intensive Care Unit

**Figure 1** - Frequency of quality indicators of nutrition therapy evaluated at a university hospital in Sergipe.

Quality indicators for enteral nutrition therapy

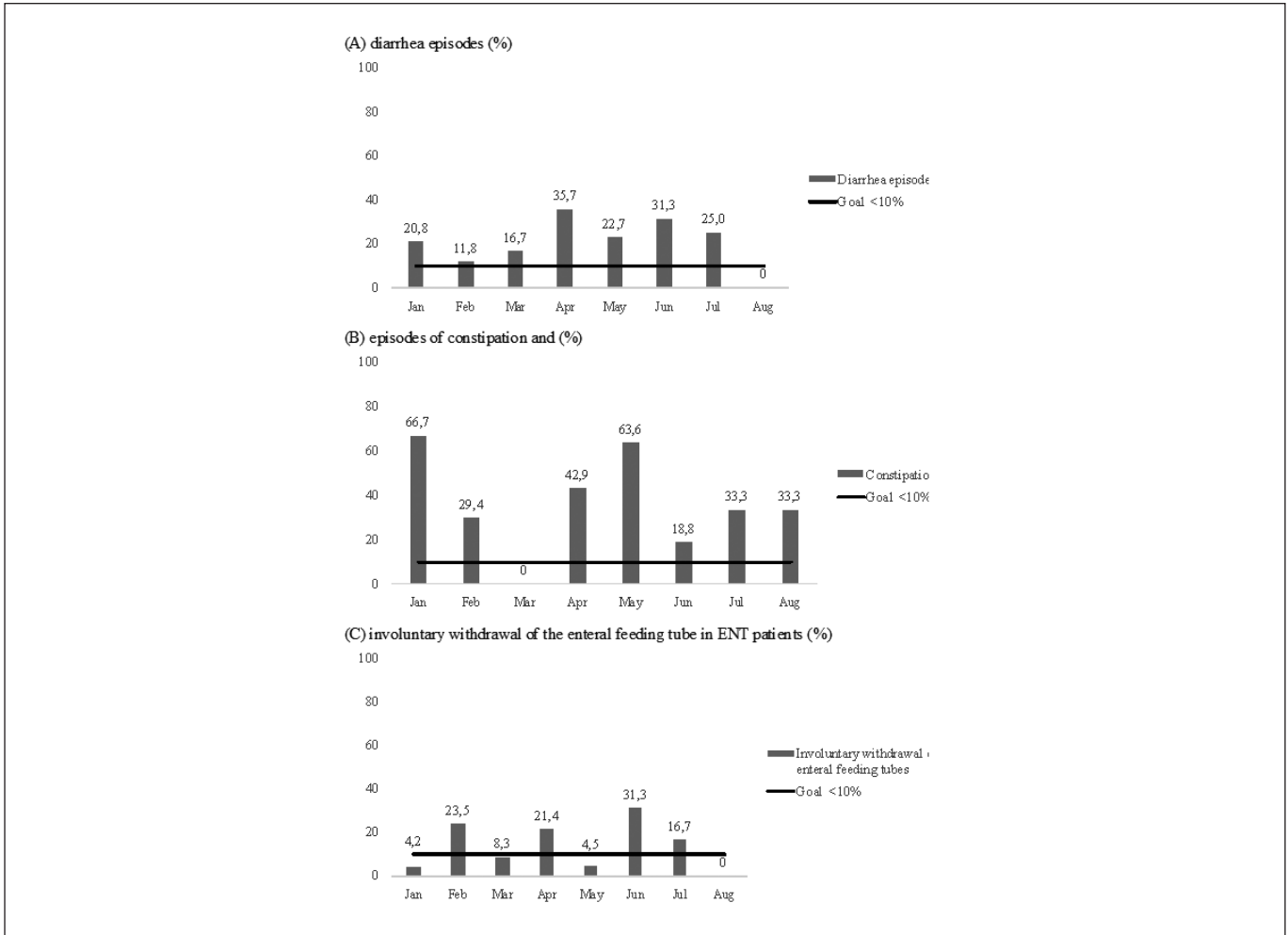


Figure 2 - Quality indicators of nutrition therapy evaluated at a university hospital in Sergipe, referring to the frequency of complications associated with nutritional therapy.

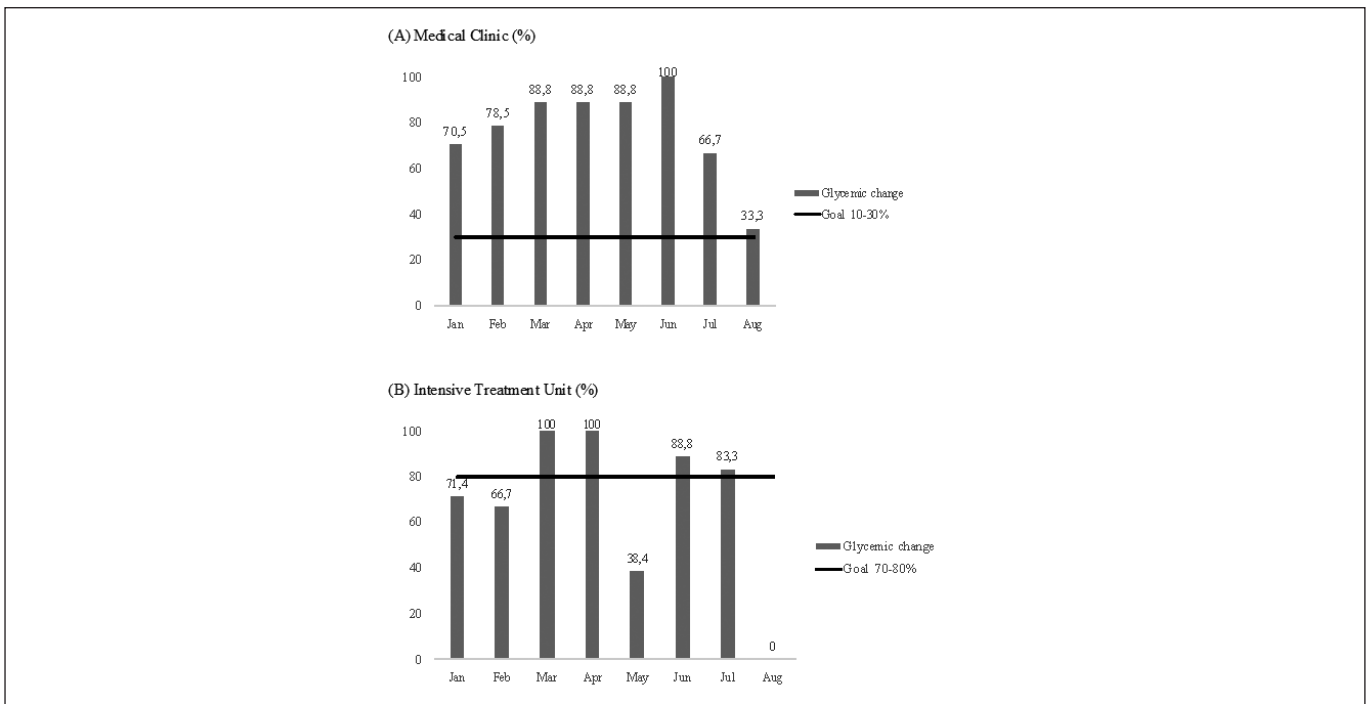


Figure 3 - Quality indicators of nutrition therapy evaluated at a university hospital in Sergipe, referring to the frequency of glycemic change, according to the sector evaluated.

## DISCUSSION

The QINT evaluated in this study indicated a high percentage of inadequacy, differing from the recommended targets.

Nutritional screening is an important tool for the nutritional evaluation of patients in a hospital environment, allowing the identification of individuals at a nutritional risk and assisting with an immediate nutritional intervention<sup>1,6</sup>.

In this study, it was noted that the application of nutritional screening in the patients evaluated shortly after admission indicated an unfavourable result, much lower than the recommended target. Sá & Marshall<sup>7</sup> observed that nutritional screening was above the recommended target, unlike that observed in this study. This result may be justified by the fact that the location where the authors' work was carried out already had a routine of applying nutritional screening, unlike the university hospital where our study was conducted.

In relation to the BMI calculation, it was observed that it was carried out in all of the months evaluated, but the recommended target (>80%) was not reached. Its inclusion in nutritional evolution was observed in the first five months of evaluation, achieving the highest percentage of compliance in May (68.1% of cases). However, there was a reduction in its registration in records in the last three months, similar to the results of a study performed in a private hospital in which the BMI measurement was obtained in only 16% of patients<sup>1</sup>.

Adequate nutritional intake is fundamental for recovery and/or to maintain patients' nutritional state. In hospitalized individuals, energy expenditure may be increased on account of the pathology, with the prescription and adequacy of energy targets for better clinical outcomes required<sup>1</sup>.

The energy expenditure calculation (Figure 1c) was carried out between January and May, indicating a rising percentage of 12.5% in January to 45.4% in May, but it did not reach the recommended value (>80%). In relation to calorie intake (Figure 1d), the month of May presented the highest percentage of adequacy but did not reach the target in any of the months evaluated.

The data referring to patients' calorie intake in this study draws attention, revealing ineffective nutrition therapy, since there is no appropriate control in the nutrition therapy which is being prescribed, as there are no records for patients' dietotherapy in their records. For this reason, it is important to emphasize that the results regarding the caloric intake may have been super or underestimated.

The inadequacy of the previously cited indicators may be justified on account of the lack of sufficient professionals, a Multi-professional Nutrition Therapy Team (MNTT), and nutritional service protocols, which undermines the effectiveness of the nutritional support provided. Standardization of the

service and application of QINT are fundamental, to evaluate the quality of ENT management, favouring the preparation of strategies which minimize the complications associated to this therapy<sup>8</sup>.

A long hospitalization period and fasting time affect patients' nutritional state, causing metabolic changes which undermine the immunological function and the healing process and favouring changes in body composition. In addition, they may cause infections, pressure injuries, damage the permeability of the intestinal barrier and increase morbi-mortality<sup>9,10</sup>.

In this study, >24-hour fasting was observed in the months analyzed, except for May, which reached the recommended target. Generally speaking, this could be explained by the presence of patients diagnosed with pancreatitis, having tests and the need for pre- and post-operative fasting. The long fasting period needs to be discussed with a multi-professional team, so that alternatives are adopted which reduce this often unnecessary period, by applying protocols and better communication between team members.

Other factors become obstacles which prevent reaching targets for ENT patients, such as: diarrhoea, constipation and involuntary withdrawal of the feeding tube. The presence of diarrhoea and constipation above the target established in the months evaluated confirms the need for greater attention to prevent and control gastrointestinal complications associated to nutrition therapy, with various reasons existing for its interruption.

In a study carried out by Ramakrishnan et al.<sup>11</sup> in an intensive care unit, carrying out internal procedures were responsible for 55.9% of NT interruptions, while gastrointestinal symptoms stood at 24.2%.

With regards to the presence of diarrhoea, Zhao et al.<sup>12</sup> confirm that it is a common ENT complication, which affects the patient's recovery and increases hospitalization time, but this should not only be associated to nutrition therapy, as it has multifactorial etiology. Bacterial contamination, the use of medication which induces diarrhoea, such as antibiotics, and pathological implications are other factors which foster the emergence of this complication<sup>4</sup>.

Constipation, which is another frequent complication, is also worthy of comment. The type of diet prescribed, prolonged bed-rest, dehydration and the use of medication, such as benzodiazepines and opioids, are important causes for its occurrence<sup>4</sup>.

Involuntary withdrawal of the feeding tube was also a frequent problem. However, it presented a compliance variation when it reached the target proposed in alternate months and the last month evaluated, when there were no episodes

of feeding tube withdrawal. It is interesting to highlight the importance of the nursing team for the success of ENT, to maintain and control the selected form of feeding, knowing the complication arising from ENT and correcting them, so that undesirable situations are minimized<sup>13</sup>.

With regards to the glycemic change indicator, the target differs for critical and non-critical patients. We observed the indicator's non-compliance, surpassing the targets both in CM and ITU. This result was similar to Souza & Mezzomo's<sup>14</sup> study, which demonstrated 100% non-compliance.

Hyperglycaemia is a metabolic abnormality which is constantly observed in intensive care environments. Among the factors which contribute to its occurrence are the release of stress hormones and the use of glucocorticoids and octreotide. In sepsis cases, one of the diagnoses prevalent in this study, inflammatory cytokines are released, causing hemodynamic alterations, oxidative stress and an increase in inflammatory factors, which interfere in the sensitivity of insulin and the consequent increase in glycemia. Hypoglycaemia is the main complication associated to the continuous infusion of insulin for glycemic control. The excess insulin administered, interruption of nutritional support and medication are among the main causes<sup>15,16</sup>.

The results of this study should be interpreted with caution, as there are a number of limitations. The data collection period was less than one year, but produced important results which present the hospital's nutritional assistance scenario, demonstrating the need for intervention. In addition, the lack of notes on the records, which were characterized as "not informed", complicated the consolidation of the results.

This research was only carried out with closed ENT system patients, and considering the relevance of NT in hospitalized patients, we suggest the application of QINT in patients fed orally and parenterally, since many are at nutritional risk. In addition, we recommend the application of other indicators, which were not used in this study, to guide planning, in order to apply QINT in clinical practice.

## CONCLUSION

The application of QINT allowed the identification of critical points in the service and will contribute towards adopting corrective and preventive actions for NT effectiveness at the hospital, providing patient security by recovering the nutritional stage and decreasing complications. Therefore, the formation of a MNNT, the adoption of protocols which enable an adequate service are important, and the application of QINT should be continually carried out, to evaluate and improve nutrition therapy.

## REFERENCES

1. Bezerra RGS, Costa VL, Figueira MS, Andrade RS. Indicadores de qualidade na terapia nutricional enteral em sistema fechado em um hospital particular na cidade de Belém – PA. *Rev Bras Nutr Clin*. 2014;29(1):20-5.
2. Lopes SP, Castro MG, Vasconcelos MIL, Lopes JP, Oliveira JF. Desenvolvimento de protótipo de software para auxílio na aplicação de indicadores de qualidade em terapia nutricional. *J Health Inform*. 2015;7(3):75-81.
3. Luz ERL, Mezzomo TR. Estado nutricional e indicadores de qualidade em terapia nutricional enteral em pacientes institucionalizados com paralisia cerebral. *Demetra*. 2015;10(1):189-202.
4. Verotti CCG, Ceniccola GD. Indicadores de Qualidade em Terapia Nutricional na Unidade de Terapia Intensiva. In: Tolledo D, Castro M, orgs. *Terapia Nutricional em UTI*. 1ª ed. Rio de Janeiro: Rubio; 2015. p. 361-8.
5. Verotti CCG. Contribuição para seleção de dez indicadores de qualidade em terapia nutricional [Dissertação de mestrado]. São Paulo: Faculdade de Medicina da Universidade de São Paulo; 2012.
6. Fontes SR, Henriques GS, Nahim-Safadi CMA, Souza ASB, Jansen AK. Triagem nutricional como ferramenta de organização da atenção nutricional hospitalar. *Rev Bras Nutr Clin*. 2016;31(2):124-8.
7. Sá JSM, Marshall NG. Indicadores de Qualidade em Terapia Nutricional como ferramenta para avaliação da assistência nutricional em pacientes hospitalizados. *Com Ciênc Saúde*. 2014;25(2):127-40.
8. Lee A, Oliveira Filho RS, Cardenas TC, Ozório GA, Gropp JPL, Waitzberg DL. Quality control of enteral nutrition therapy in cancer patients at nutritional risk. *Nutr Hosp*. 2017;34(2):264-70.
9. Bazzi NB, Leal V, Lira Júnior HF, Santos JM, Ferreira MG, Zeni LAZR. Estado nutricional e tempo de jejum em pacientes submetidos a cirurgias colorretais eletivas. *Nutr Clín Diet Hosp*. 2016;36(2):103-10.
10. Almeida RR, Sousa FCM. Tempo de jejum para exames e as implicações no estado nutricional de pacientes hospitalizados. *Nutr Clín Diet Hosp*. 2017;37(3):124-30.
11. Ramakrishnan N, Daphnee DK, Ranganathan L, Bhuvaneshwari S. Critical care 24 × 7: But, why is critical nutrition interrupted? *Indian J Crit Care Med*. 2014;18(3):144-8.
12. Zhao R, Wang Y, Huang Y, Cui Y, Xia L, Rao Z, et al. Effects of fiber and probiotics on diarrhoea associated with enteral nutrition in gastric cancer patients: A prospective randomized and controlled trial. *Medicine (Baltimore)*. 2017;96(43):e8418.
13. Rocha AJSC, Oliveira ATV, Cabral NAL, Gomes RS, Guimarães TA, Rodrigues WB, et al. Causas de interrupção de nutrição enteral em unidades de terapia intensiva. *Rev Pesq Saúde*. 2017;18(1):49-53.
14. Souza MA, Mezzomo TR. Estado nutricional e indicadores de qualidade em terapia nutricional de idosos sépticos internados em uma unidade de terapia intensiva. *Rev Bras Nutr Clin*. 2016;31(1):23-8.

15. Verma V, Kotwal N, Upreti V, Nakra M, Singh Y, Shankar KA, et al. Liraglutide as an Alternative to Insulin for Glycemic Control in Intensive Care Unit: A Randomized, Open-label, Clinical Study. *Indian J Crit Care Med.* 2017;21(9):568-72.
16. Paixão CT, Silva LD, Doerzapff PB, Granadeiro RMA, Farias RLA, Santos SS. Fatores de risco para hipoglicemia em pacientes que usam infusão contínua de insulina endovenosa na unidade de terapia intensiva. *ABCS Health Sci.* 2014;39(3):194-8.

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**Place of study:** Universidade Federal do Sergipe, Lagarto, SE, Brazil.

**Conflict of Interest:** None.