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# The usefulness of a hospital nutrition support team, as a separate unit, in diagnosing and treating malnutrition

## Przydatność szpitalnego zespołu żywieniowego, jako wydzielonej komórki organizacyjnej, w rozpoznawaniu i leczeniu niedożywienia

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## Abstract

**Introduction:** Malnutrition is still a serious clinical problem, which has negative consequences. It not only prolongs hospitalisation, but also delays recovery. The diagnosis of malnutrition is as important as any other medical diagnosis. **Aim of the study:** To assess the usefulness of a hospital nutrition support team, as a separate unit, to diagnose and treat malnutrition. **Material and methods:** Data from 5 years were retrospectively collected. We analysed the number of patients each year and the number of days of artificial nutrition (enteral and parenteral) covered by the National Health Fund. During the first 2.5 years, the nutrition support team functioned as a part of surgical department, and for the next 2.5 years it was a separate unit. **Results:** The activity of the hospital nutrition support team, as a separate unit, has significantly increased the number of nutritional procedures, enteral in particular. In the first half of the year 2014, the number of parenteral nutrition days was 64, and the number of enteral nutrition days was 215. However, in the next 6 months, when the team functioned as a separate unit, the number of days was 185 and 1,511, respectively, despite a similar number of hospitalised patients. The activity of a separate nutrition support unit resulted in a significant, more than 7-fold increase in the number of days of the enteral nutrition (1,032 vs. 7,479; $p < 0.001$). The increase in the number of days of parenteral nutrition was also significant (999 vs. 1,412; $p < 0.001$). **Conclusion:** Establishing a hospital nutrition support team significantly increased the number of days of both enteral and parenteral nutrition in malnourished patients. The activity of the team is cost-effective and profitable for the hospital.

**Keywords:** nutrition team, enteral nutrition, parenteral nutrition, malnutrition

## Streszczenie

**Wstęp:** Niedożywienie jest nadal poważnym problemem, który pociąga za sobą negatywne konsekwencje. Z jednej strony przedłuża czas hospitalizacji, z drugiej powoduje opóźnienie powrotu chorego do zdrowia. Niedożywienie jest tak samo ważnym rozpoznaniem jak inne choroby. **Cel:** Ocena przydatności szpitalnego zespołu żywieniowego, jako wydzielonej komórki organizacyjnej, w rozpoznawaniu niedożywienia i prowadzeniu leczenia żywieniowego. **Materiał i metody:** Do analizy włączono dane dotyczące liczby pacjentów hospitalizowanych oraz rozliczonych dni żywienia pozajelitowego (ŻP) i dojelitowego (ŻDJ). Analizą objęto pięć lat, z których pierwsze dwa i pół roku obejmuje działalność zespołu żywieniowego w formie „czynnościowej", a kolejne dwa i pół roku – działalność Szpitalnego Zespołu Żywieniowego jako wydzielonej komórki organizacyjnej. **Wyniki:** Działalność Szpitalnego Zespołu Żywieniowego, jako wydzielonej komórki organizacyjnej, spowodowała znamienne zwiększenie liczby procedur żywieniowych, zwłaszcza dojelitowych. W przełomowym roku 2014 w pierwszym półroczu liczba dni ŻP wynosiła 64, a ŻDJ była równa 215, podczas gdy w drugim półroczu (wydzielony Szpitalny Zespół Żywieniowy) liczba dni ŻP to 185, a ŻDJ – 1511, przy porównywalnej liczbie pacjentów hospitalizowanych. Aktywność Szpitalnego Zespołu Żywieniowego spowodowała łącznie ponad 7-krotne zwiększenie liczby dni ŻDJ (1032 *vs* 7479; $p < 0{,}001$). Wzrost liczby dni ŻP również był istotny (999 *vs* 1412; $p < 0{,}001$). **Wnioski:** Utworzenie Szpitalnego Zespołu Żywieniowego znacząco zwiększyło liczbę dni żywienia zarówno dojelitowego, jak i pozajelitowego u pacjentów niedożywionych. Ponadto jego działalność przynosi szpitalowi wymierną korzyść finansową.

**Słowa kluczowe:** zespół żywieniowy, żywienie dojelitowe, żywienie pozajelitowe, niedożywienie

## INTRODUCTION

Although complications of malnutrition in hospital patients are well known, they are unfortunately widely excluded from the awareness of doctors. There is a common conviction that a disease, especially a severe one, is accompanied by emaciation, which is a part of the clinical picture of a given disease. Malnutrition is still a major problem that entails negative consequences. It not only prolongs hospitalisation, but also delays recovery. Malnourished patients are more susceptible to all kinds of complications related to medical procedures and infections, which represent a particularly important problem in a hospital environment. Complications of malnutrition include, among others, increased frequency of infections, impaired postoperative wound healing, increased mortality, prolonged hospitalisation and convalescence, which, when combined, increase the overall treatment costs. Malnutrition does not result from an inadequate diet, but from the inability to receive food due to the general condition of the patient. In such cases, enteral (EN) or parenteral (PN) nutrition is necessary. Malnutrition is a disease that has its own number in the International Statistical Classification of Diseases and Related Health Problems (ICD-10) – revision 10: E40–E46. Therefore, the diagnosis of malnutrition is as important as any other medical diagnosis.

## AIM OF THE STUDY

Since the majority of medical personnel lack sufficient knowledge related to clinical nutrition, we conducted a study to assess the usefulness of a hospital nutrition support team (NST), as a separate organisational unit, in the diagnosis and treatment of malnutrition.

## MATERIAL AND METHODS

Data on the number of hospitalised patients and the days of nutrition were used in the study. The data did not include intensive care patients covered by the Therapeutic Intervention Scoring System (TISS). We analysed data from 5 years, including 2.5 years when the team had a "functional form," followed by 2.5 years of the functioning of the NST as a separate organisational unit. The significance of the differences between the numbers of patients receiving nutritional treatment in different periods was determined using a 2x2 table and a chi-squared test.

| Type of nutritional treatment | The number of days of nutrition (no ICU) | | | | | |
|---|---|---|---|---|---|---|
| | No NST | | | NST | | |
| | 2012 | 2013 | 2014 (I) | 2014 (II) | 2015 | 2016 |
| Parenteral nutrition | 489 | 446 | 64 | 185 | 574 | 653 |
| Enteral nutrition | 367 | 450 | 215 | 1,511 | 2,900 | 3,068 |
| Number of patients | 19,144 | 19,505 | 9,501 | 9,707 | 19,559 | 19,618 |
| **ICU** – Intensive Care Unit; **NST** – Nutrition Support Team. | | | | | | |

*Tab. 1. The number and the method of feeding patients in subsequent years*

## RESULTS

In the analysed period 2012–2016, the number of patients hospitalised each year was similar (19,144–19,618) (Tab. 1). Functioning of the NST as a separate organisational unit significantly increased the number of days of nutrition, enteral nutrition in particular. This is best seen in 2014, when the number of patients was similar in the first and the second half of the year. In the first half of 2014, there were 64 PN days and 215 EN days, whereas in the second half of the year, when the NST started its activity, there were 185 PN days and 1,511 EN days. A similar increasing trend was observed in 2015 and 2016 (Tabs. 1 and 2). The functioning of the NST caused a 7–8-fold increase in the number of EN days. The number of PN days also increased (999 vs. 1,412), though to a lesser extent compared to EN (Tab. 2, Fig. 1).

| Type of nutritional treatment | The number of days of nutrition (no ICU) | | Significance |
|---|---|---|---|
| | No NST | NST | |
| | 2012–2014 (I) | 2014 (II)–2016 | |
| Parenteral nutrition | 999 | 1,412 | $p < 0.001$ |
| Enteral nutrition | 1,032 | 7,479 | $p < 0.001$ |
| Number of patients | 48,150 | 48,884 | - |
| **ICU** – Intensive Care Unit; **NST** – Nutrition Support Team. | | | |

*Tab. 2. Comparison of the number of patients receiving parenteral and enteral nutrition depending on the presence of NST*

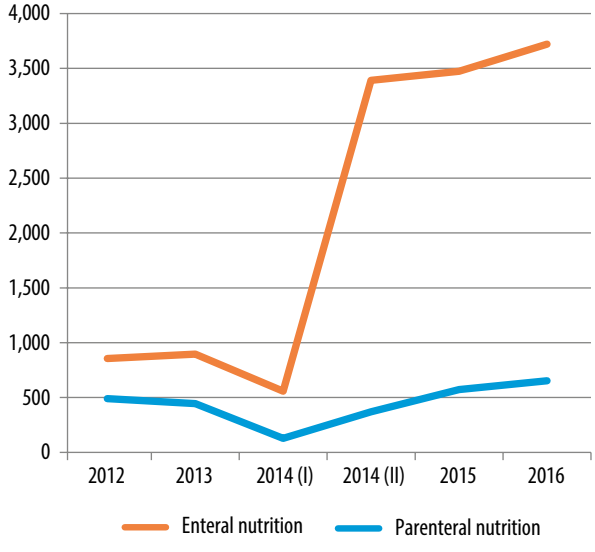


*Fig. 1. The number of patients receiving enteral and parenteral nutrition per year in the years 2012–2016*



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## DISCUSSION

Malnutrition usually begins in the home setting and becomes more severe during hospitalisation. Data collected during the nutrition day survey in Poland ("nutrition Day in POLAND") showed that about 30% of patients admitted to hospital declared weight loss 3 months before hospitalisation, and about 20% of patients declared weight loss of more than 5 kg. About 60–70% of hospital patients and up to 85% of residents of long-term care institutions show signs of malnutrition[1]. Studies comparing the nutritional status and the occurrence of complications have clearly shown that 27% of malnourished patients developed complications (relative risk, RR = 1.6), and that there was a nearly 3-fold increase in mortality among these patients (12.4% vs. 4.7%; RR = 2.65). Hospital stay was, on average, 7 days longer for malnourished patients, and the treatment costs were more than 300% higher compared to non-malnourished patients[2].

Based on this type of research, nutrition associations issued recommendations to improve the nutritional status of patients with severe malnutrition before surgical treatment initiation, even if this means delayed therapy. Patients who do not present with malnutrition do not benefit from nutritional therapy[3–7].

The great importance of patient's nutritional status for the prognosis has forced the implementation of formal screening of the nutritional status in patients admitted to hospital (Regulation of the Minister of Health of 15 September 2011, Journal of Laws No. 202). This was followed by establishing nutrition support teams (NST). Unfortunately, the implementation of the decision was "temporarily" suspended and the law remained "dead." The lack of requirement for a nutritional unit was justified by financial aspects related to the employment of additional personnel and the lack of dieticians in hospitals. However, accreditation requirements, which granted additional scores for NST functioning in hospitals, represented an argument for establishing such teams. In many hospitals, the NST had a "functional form," i.e. medical personnel experienced in clinical nutrition were assigned additional duties.

The scope of nutritional intervention depends on the general patient's condition and the possible routes of administration. Oral diet modification represents the simplest solution. Another step is to enrich the diet with oral dietary supplements. These two measures are not additionally financed by the National Health Fund. The next level of nutritional ladder comprises industrial diets administered through feeding tubes introduced into the gastrointestinal (GI) tract. If nutrition via GI tract is not possible, exclusive PN is necessary. Industrial diets administered via a feeding tube and PN are additionally financed for each day of nutrition. Since each type of nutrition is financed at a certain level, such procedures constitute a measurable profit for the hospital.

So what is the financing of nutritional treatment in a hospital under the National Health Fund contract? The hospital receives 108.16 PLN for each day of EN. The costs of diet, administration devices and medical tests are usually estimated at 30–40 PLN. Thus, about 60–80 PLN can be gained for each day of nutritional treatment. The financial settlement of PN is somewhat more complicated. The hospital receives 108.16 PLN for incomplete nutrition, 216.32 PLN for complete nutrition, and 324.48 PLN for nutrition enriched with immunomodulatory substances.

Incomplete nutrition, i.e. devoid of an essential nutrient, such as lipids, micronutrients or vitamins, should not be used as a form of saving and is contrary to the principle of completeness, i.e. providing the patient with all nutrients. Patients should receive all nutrients they need from the point of view of their current metabolism[8].

So what is the profitability of PN in its most common form, i.e. complete PN, the cost of which is estimated by the National Health Fund at 216.32 PLN for each day of nutrition? The costs of a ready to use (RTU) bag, vitamins, micronutrients, medical tests and an administration kit are estimated at about 120–140 PLN. Our calculations again show that about 70–90 PLN can be gained for each day of nutrition.

It was only a few years ago that education on clinical nutrition was introduced in the curriculum of medical schools and specialist training. The presence of medical personnel specialised in nutrition fills the gap and allows for a gradual transfer of knowledge and the development of a habit to perform nutritional risk assessment as well as the implement adequate management. Our study demonstrated that the activity of NST resulted in the highest increase in the group of patients receiving enteral nutrition. Therefore, it seems necessary to raise awareness among medical personnel and to put a strong emphasis on the education in terms of identifying patients who are quantitatively and qualitatively chronically malnourished. Unfortunately, long-term hypocaloric and unbalanced nutrition is commonly considered sufficient for patients. Obese patients, who are not considered in the context of malnutrition, although they represent a group at particular risk of this condition, pose a great difficulty. The activity of NST also contributed to an increased number of days of nutrition for patients requiring parenteral administration, however to a lesser extent when compared to enteral nutrition. Since this group is dominated by GI insufficiency, it is defined more effectively, which facilitates the decision to initiate nutritional treatment. A NST brings a measurable financial benefit to the hospital. The price of nutritional procedures guarantees their profitability, even if some financial expenses are needed at the beginning of establishing a NST.

## CONCLUSIONS

1. Our experience points to the medical rationale for establishing nutrition support teams.
2. Establishing a nutrition support team caused a 7–8-fold increase in the number of days of enteral nutrition and also increased the number of days of parenteral nutrition, though to a lesser extent.
3. A nutrition support team brings a measurable financial benefit to the hospital.



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## Conflict of interest

*Authors do not report any financial or personal connections with other persons or organisations, which might negatively affect the contents of this publication and/or claim authorship rights to this publication.*

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