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A survey of medical students' and doctors' knowledge of nutritional correction

Medicinos studentų ir gydytojų žinių apie mitybos korekciją tyrimas

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Background / objective

The nutritional state of hospitalized patients is far from ideal. A way to improve it is to develop the personnel's theoretical and practical background on nutritional correction. Our aim was to survey the level of knowledge among physicians in Lithuanian medical institutions and students of the Lithuanian University of Health Sciences with regard to nutritional insufficiency and its correction.

Methods

A random voluntary questionnaire survey was undertaken. The questionnaire was completed by the university and municipal hospital physicians, primary care physicians, residents, 5th–6th year students of the Faculty of Medicine and the 3rd year students of the Faculty of Nursing of the Lithuanian University of Health Sciences. Answers to the questionnaire reflected the theoretical and practical background of the respondents.

Results

Overall, 134 doctors and 67 students or residents anonymously completed the questionnaire with the response rate of 100%. The median of correct answers was 8.5 (6–10) among the university hospital doctors who scored best. Primary care physicians showed the worst knowledge with the median score of 4 (1–6), $p < 0.05$. Doctors showed a significantly better knowledge than students did ($p < 0.001$).

Conclusions

Overall, there is a poor knowledge with regard to the incidence of malnutrition. Hospital doctors have a better knowledge of nutritional correction than both the primary care physicians and the students. Students' teaching is insufficient considering

that their theoretical knowledge is worse as compared with that of doctors. A much more intense professional education is crucial to improve the nutritional state of patients in the hospitals as well as in the ambulatory practice.

Key words: nutritional correction, professional knowledge, professional teaching

Įvadas / tikslas

Stacionaro pacientų mitybos būklė yra toli gražu ne ideali. Vienas iš būdų ją pagerinti yra personalo teorinių ir praktinių žinių apie mitybos korekciją gerinimas. Mūsų tyrimo tikslas yra įvertinti Lietuvos gydymo įstaigų gydytojų ir Lietuvos sveikatos mokslų universiteto studentų žinias apie mitybos nepakankamumą ir jo korekciją.

Metodai

Atlikta atsitiktinė savanoriška anketinė apklausa. Anketą užpildė universitetinių bei municipalinių ligoninių bendrosios praktikos gydytojai, rezidentai, Lietuvos sveikatos mokslų universiteto medicinos fakulteto V ir VI kurso bei Slaugos fakulteto III kurso studentai. Anketinės apklausos atsakymai atspindi respondentų teorinius ir praktinius pagrindus.

Rezultatai

134 gydytojai ir 67 studentai ar rezidentai anonimiškai atsakė į visus anketos klausimus. Geriausiai atsakė universitetinių ligoninių gydytojai, o prasčiausiai – bendrosios praktikos gydytojai: teisingų atsakymų mediana atitinkamai 8,5 (6–10) ir 4 (1–6), $p < 0,05$. Gydytojų žinios yra statistiškai patikimai geresnės nei studentų ($p < 0,001$).

Išvados

Apie mitybos nepakankamumo paplitimą žinoma mažai. Stacionaro gydytojų žinios apie mitybos korekciją yra geresnės nei bendrosios praktikos gydytojų ir studentų. Studentai nepakankamai supažindinami su mitybos problemomis – jų teorinės žinios yra prastesnės nei gydytojų. Norint pagerinti ligonių mitybos būklę ligoninėse ir ambulatorinėje praktikoje, reikalingas daug intensyvesnis profesinis mokymas.

Reikšminiai žodžiai: mitybos korekcija, profesinės žinios, profesinis mokymas

Introduction

Based on reports in the medical literature, the nutritional state of hospitalized patients is far from ideal. The published incidence of malnutrition in the hospitals varies between 20 and 40 percent [1–8]. To cure nutritional disorders successfully, the medical staff must possess a sufficient theoretical and practical background on nutritional correction and understand the relevance of this problem. Moreover, medical students must gain enough nutritional knowledge during their studies [8–12]. A recent study indicated positive and long-term sustaining effects of educational intervention on nutrition for medical students [13]. This reflects the room for improving the teaching systems. Besides technical skills, the attitudes of the medical and nursing staff towards nutrition play a very important role [14]. On the outpatient basis, knowledge about the diagnostics of malnutrition and methods of its correction is also relevant, considering that the outpatients require nutritional support more frequently. According to Elia et al., the number of outpatients receiving nutritional support increases annually by 20% [15]. Opinions emerge that nutritional education and emphasizing the importance of nutritional correction are not directly proportional to the development of skills [16–18]. Thus, before implementing any improvements in education and training, a thorough evaluation of the knowledge and attitudes of the medical staff and students is crucial.

More than ten years ago, the Lithuanian Society of Enteral and Parenteral Nutrition has been established. Since then, contemporary methods of nutritional correction have been intensively started to be implemented in Lithuanian hospitals and polyclinics. However, despite these achievements, the data indicating the background of Lithuanian doctors and medical students in the field of nutritional support are lacking. The aim of the present study was to evaluate the level of knowledge among physicians in the Lithuanian medical institutions as well as among students of the Lithuanian University of Health Sciences.

Materials and methods

During 2005–2006, a random voluntary survey of doctors, students, and residents was carried out. The respondents were volunteer physicians with more than 10 years of clinical experience, regularly facing the

problem of malnutrition and nutritional correction, as well as students and residents who had already studied the subjects including the questions of parenteral and enteral nutrition. A multiple choice questionnaire with 11 general questions related to nutritional support and two clinical situations had to be completed (Figure 1). The questions were selected from the similar published questionnaires and simplified considering that there are no such deep traditions of nutritional support in Lithuania. Each question had five possible answers of which only one was correct. The study was approved by the local ethical committee. The respondents were divided into physicians and students or residents. Both groups were subdivided into the subgroups. The group of physicians consisted of primary care physicians (PCPs) as well as of municipal (MDs) and university hospital doctors (UDs). The subgroups of students and residents were resident physicians (RPs), 5th (MF5y) and 6th (MF6y)

Figure 1. The questionnaire

1. How many kcal does 1g of protein, fat and carbohydrate contain?

a) 5	b) 9	c) 7	d) 4	e) 5

2. How many kcal does an inpatient weighing 70 kg need (approximately)?

a) 500	b) 10.000	c) 2.000	d) 5.000	e) 10

3. How many kcal does a febrile inpatient weighing 70 kg need (approximately)?

a) 500	b) 10.000	c) 2.000	d) 5.000	e) 10

4. How many grams of nitrogen does an inpatient weighing 70 kg need (approximately)?

a) 120	b) 52	c) 12	d) 520	e) 1.200

5. How many grams of protein match 1g of nitrogen?

a) 1.75	b) 15.50	c) 32.75	d) 90.65	e) 6.25

6. How many kcal does one litre of 5% glucose contain?

a) 2.000	b) 6.000	c) 600	d) 200	e) 20

7. In what units is the body mass index (BMI) measured?

a) kg/m	b) m/kg^2	c) m/kg	d) kg/m^2	e) kg

8. What is a normal (acceptable) BMI?

a) 4–10	b) 19–25	c) 24–30	d) 29–35	e) 9–15

9. How often the nutritional insufficiency is diagnosed among inpatients?

a) 2%	b) 60%	c) 8%	d) 15%	e) 30%

10. What reduction of body mass over 3 months may be considered a sign of nutritional insufficiency?

a) 2%	b) 10%	c) 20%	d) 40%	e) 60%

11. Which of the following investigations reflects nutritional insufficiency the worst?

a) BMI	b) percentage reduction of body mass	c) palm strength	d) serum albumin	e) body weight

12. A 40-year-old obese man was hospitalized because of pneumonia. His body mass had decreased by 30% over three months. Now he weighs 100 kg. Does he have to receive:

a) parenteral nutrition	b) supplementary nutrition	c) weight loss diet	d) nightly nasogastric intubation for nutritional support	e) fiber-rich diet

13. The most reliable way to test the position of the enteral feeding tube is:

a) to perform an abdominal X-ray	b) to inject air through the tube and listen with a stethoscope	c) to perform a chest X-ray	d) to identify an acidity of the content aspirated through the tube	e) to control with an endoscope

Answers: 1) D, 2) C, 3) C, 4) C, 5) E, 6 D, 7) D, 8) B, 9) B, 10) B, 11) C, 12) B, 13) A

year students of the Faculty of Medicine as well as the 3rd (NF3y) year students of the Faculty of Nursing of the Lithuanian University of Health Sciences (former Kaunas University of Medicine). The median (interquartile range) of correct answers and the percentage of correctly solved questions 1, 8, 9 and the clinical problems in the groups and subgroups were evaluated (Figure 1). We analyzed separately the results of questions 1, 8, 9 and both clinical problems. Question 1 was considered an indicator of theoretical background; question 8 represented the knowledge of the incidence of malnutrition and the relevance of the problem, whereas question 9 reflected the interest in nutritional problems. The questionnaire had to be completed without using any additional literature or information; however, the time for the answer was not strictly limited. The data were processed using a standard statistical program (SPSS-13). The normality of the continuous data was tested with the help of the Kolmogorov–Smirnov test. For a comparison of two groups of ordinal data, the Mann–Whitney U test was applied, and the Kruskal–Wallis one-way analysis of variance was used for a comparison of three or more groups. Multiple paired comparisons were performed using the Bonferroni–Dunn test. To test the interdependence of the qualitative data, the chi-square test was employed. The difference was considered statistically significant at $p < 0.05$.

Results

Overall, 134 doctors and 67 students or residents anonymously completed the questionnaire with a 100 percent response rate. Table 1 shows the scores in the groups and subgroups of respondents. Doctors scored statistically significantly better than did students and residents ($p < 0.001$). This difference was especially evident when PCPs were excluded ($p < 0.0001$). There were doctors who answered no question and those who correctly answered all 13 questions, whereas in the group of students and residents the lowest and highest scores were respectively 4 and 11. The worse results obtained when PCPs had been included encouraged us to further analyze the scores in the subgroups.

Having compared the obtained data, we observed an obvious tendency that doctors scored better than students, except PCPs who showed the worst results. The differences between PCPs and MDs, as well as between PCPs and UDs were statistically significant ($p < 0.001$). On the other hand, there was no statistically significant difference between MDs and UDs.

In the group of students and residents, MF5ys scored best. Both MF5ys and NF3ys scored significantly more than MF6ys ($p < 0.05$), indicating that the knowledge was poorer among the upper year students. In all cases, PCPs scored significantly less than students ($p < 0.05$).

Table 1. Lowest, highest and median score in the groups and subgroups

Groups	Subgroups	N	Score		
			Median (IQR)	Lowest	Highest
Doctors	PCP	15	4 (1–6)	0	8
	MD	75	8 (6–10)	0	13
	UD	44	8.5 (6–10)	0	13
	Overall	134	8 (6–10)	0	13
Students and residents	MF5y	9	8 (6–8.5)	4	9
	MF6y	23	6 (5–7)	5	11
	RP	12	6 (4.25–7)	4	8
	NF3y	23	7 (6–7)	4	9
	Overall	67	6 (5–7)	4	11

PCP, primary care physician; MD, doctor working in municipal hospital; UD, doctor working in University hospital; RP, resident physician; MF5y, 5th year student of the faculty of Medicine of Lithuanian University of Health Sciences; MF6y, 6th year student of the faculty of Medicine of Lithuanian University of Health Sciences; NF3y, 3rd year student of the Faculty of Nursing of Lithuanian University of Health Sciences.

MDs and UDs scored better than MF6ys, NF3ys and RPs ($p < 0.05$). The average score of MF5ys was lower than that in the subgroups of both MDs and UDs; however, no statistically significant difference was found ($p > 0.05$).

Questions 1, 8, 9 as well as clinical situations 12 and 13 were analyzed separately, and differences between the groups were determined using the chi-square test. We evaluated question 1 in the groups and subgroups as an indicator of the theoretical background (Table 2). The students answered this very simple theoretical question worse than their elder colleagues ($p > 0.05$). Within the subgroups, PCPs showed the poorest results: even 76.6% of PCPs did not manage to answer correctly, and their score was significantly lower as compared with MDs and UDs ($p < 0.05$). Strangely enough, RPs scored also not much better (50%). With question 8, students scored significantly better than doctors (97% and 85.1%, respectively, $p < 0.01$). In contrast with question 8, the average score of question 9 in both groups was only 24.4%. Again, students scored significantly better than doctors ($p < 0.05$). To evaluate the practical background of the respondents, the clinical situations were analyzed (Table 2). The percentage of respondents who solved correctly at least one or both problems was calculated. Students failed to solve any of the situations more often (50.7%) than doctors (41.8%). Only 3% of students and 25.4% of doctors solved both problems correctly ($p < 0.05$). Importantly, in the subgroup of PCPs all answers were wrong.

Discussion

Our survey indicates that doctors have a significantly better background than students ($p < 0.001$). UDs show the best knowledge of nutritional needs and signs of nutritional disorders with the highest median score of 8.5. In contrast, PCPs scored worst, and their background was significantly poorer in comparison with that of MDs and UDs ($p < 0.001$) and even of students ($p < 0.05$). In other countries, an insufficient knowledge among PCPs was also ascertained and related to the lack of practice [19, 20].

Before carrying out this survey, we had expected the practical background of the doctors and the theoretical background of the students to be better. To confirm these assumptions, we evaluated the results of the practical questions separately. The first assumption was confirmed as 25.16% of doctors and only 3% of students solved both clinical problems ($p < 0.05$). None of the problems was solved by 50.7% of students and 41.4% of doctors (Table 2). The second assumption was not confirmed as students scored worse than doctors when an-

Table 2. Questions representing theoretical (1, 8, 9) and practical knowledge (12 and 13)

Question		Score							
		Doctors			Students				Overall
1		89 (66.7%)			40 (59.7%)				129 (64.3%)
		PCP	MD	UD	MF5y	MF6y	RP	NF3y	
		4 (26.4%)	49 (69%)	34 (77%)	7 (77.8%)	14(60.9%)	6 (50%)	13 (56.5%)	
8		114 (85.1%)			65 (97%) **				179 (89.1%)
9		24 (17.9%)			25 (37.3%) *				49 (24.4%)
12 and 13	One correct	44 (32.8%)			31 (46.3%)				75 (37.3%)
	Both correct	34 (25.4%)			2 (3%) *				36 (17.9%)

* $p < 0.05$; ** $p < 0.01$

PCP, primary care physician; MD, doctor working in municipal hospital; UD, doctor working in University hospital; RP, resident physician; MF5y, 5th year student of the faculty of Medicine of Lithuanian University of Health Sciences; MF6y, 6th year student of the faculty of Medicine of Lithuanian University of Health Sciences; NF3y, 3rd year student of the Faculty of Nursing of Lithuanian University of Health Sciences.

swering question 1 which is one of the most elementary theoretical questions (56.5% and 66.1%, respectively), although this difference was not statistically significant. Therefore, we conclude that the theoretical background of students is as good as that of doctors. On the other hand, from question 8 we can assume that both doctors and students are aware of malnutrition as a medical problem since the majority of respondents (85.1% of doctors and 97% of students) know what is an acceptable BMI, students scoring better ($p < 0.01$) (Table 2).

The knowledge of the incidence of malnutrition was found to be especially poor (question 9). This question was one of those most wrongly answered as only 17.9% of the doctors and 37.3% of the students answered it correctly, with the average of only 24.4%. An upsetting fact is that doctors answered worse than students ($p < 0.05$).

An obvious tendency has been observed that in the group of students, MF5y and NF3y students have the best knowledge which decreases in the upper years of studies ($p < 0.05$). Apparently, the nutrition problem is poorly emphasized during the upper years of studies and the residentship.

The aforementioned results, together with the poor background of PCPs, indicate the necessity of improved education in the field of artificial nutrition. It can also be assumed that patients discharged from the hospital with percutaneous endoscopic gastrostomy (PEG), who need to continue home enteral nutrition, do not obtain an adequate help; however, to confirm this, a more detailed research would be necessary. We think that home nutritional support is not yet adequate in Lithuania.

It is difficult to compare our results with those of other studies since, to our knowledge, there are no analogous surveys. However, our data are in part comparable with the results of an English survey as the questions were similar [10]. In both our survey and the English one, no excellent results were observed. However, our results revealed a poorer background of the Lithuanian respondents. Only 24.4% of our participants correctly answered question 9, whereas in the English survey with a completely identical question a score of 60% was observed. Within our respondents, even not all university hospital doctors could answer such elementary questions as 1, 4, and 6. Unfortunately, this is not typical only of Lithuania. Similar conclusions have been also drawn in other countries [19, 21–23]. A study in Denmark showed that, despite the European guidelines of good nutritional care being implemented, a lack of knowledge and interest of the staff remain the obstacles for improvement [8]. A rather poor knowledge of malnutrition among our students and residents correlates with similar results obtained in other surveys [22, 24], showing that students' teaching about the importance of nutrition is inadequate [11, 25–27].

Although the Lithuanian Society of Enteral and Parenteral Nutrition has been already functioning for many years and organizing various seminars and trainings for students and physicians, the general situation is not yet satisfactory as the knowledge and understanding of the problem remains poor. Lithuania is probably in the situation where, in order to improve the level of nutritional correction, the legitimate conditions must be made as well as the conception and a system of measures must be created. Such measures could be an establishment of clinical nutrition steering groups in hospitals and services responsible for the home nutritional support, creating conditions for the additional financing of clinical nutrition, at least of the homecare patients.

Conclusions

Hospital doctors have a better knowledge of nutritional correction than do primary care physicians and medical students. Both students and doctors know insufficiently about the incidence of malnutrition. Teaching the students about the nutritional problems is insufficient as their theoretical knowledge is worse as compared with that of practicing physicians, and it decreases in the upper years of studies. Therefore, a substantially more intense professional education and training are needed in order to improve the nutritional state of both hospital and ambulatory patients.

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