

Original

Total Nutritional Therapy: A Nutrition Education Program for Physicians

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Acknowledgments for Research Support

This project was supported by Abbott Laboratories, Abbott Park, Illinois, USA. The authors acknowledge the presidents of the Latin American Federation of Parenteral and Enteral Nutrition (FELANPE): Jamie Escallón, Alberto Maiz, Antonio Carlos Campos, and Aldo Alvarez for their full support of the TNT initiative. Also, the authors acknowledge the support of Abbott Laboratories and Abbott International, particularly Jean-Marie Dolenc, Kathryn Hennessy, Gail Comer, Bruce Yamamoto, Alice Pappas, Darlene Johnson, and staff for their diligent efforts in making the TNT project a reality.

Abstract

Objective: Almost half of all hospitalized patients are malnourished with low physician awareness or implementation of nutrition support¹. To address this problem, a 2-day immersion course in clinical nutrition for physicians was developed by the Latin American Federation of Parenteral and Enteral Nutrition (FELANPE) with support from Abbott Laboratories. The goal of Total Nutritional Therapy (TNT) is to help physicians utilize this nutrition knowledge to increase their awareness of malnutrition and implementation of nutritional therapy. Since 1997, over 8,000 physicians have completed the TNT course in 16 Latin American countries.

Research Methods & Procedures: During 1999 and 2000, 675 participants responded to a survey 6 months after having completed the TNT course to determine what impact the course had on the use of nutrition assessment, nutrition support teams, or nutrition consultations in their clinical practice, and if they had participated in any nutrition association or conferences.

TRATAMIENTO NUTRICIONAL TOTAL: PROGRAMA PARA LA EDUCACIÓN DE LOS MÉDICOS EN NUTRICIÓN

Resumen:

Objetivo: Casi la mitad de todos los pacientes hospitalizados se encuentran desnutridos y los médicos tienen muy poco conocimiento o apenas utilizan el soporte nutricional¹. Para corregir este problema, la Federación Latinoamericana de Nutrición Parenteral y Enteral (FELANPE) ideó un curso introductorio de nutrición clínica para médicos de dos días, con el apoyo de los Laboratorios Abbott. El objetivo del tratamiento nutricional total (TNT) es ayudar al médico a aprovechar sus conocimientos de nutrición para incrementar la conciencia sobre malnutrición y aplicación del tratamiento nutricional. Desde 1997, más de 8.000 médicos han completado el curso TNT en 16 países latinoamericanos.

Métodos y procedimientos experimentales: Durante 1999 y 2000, 675 participantes respondieron, seis meses después de haber terminado el curso TNT, a una encuesta en la que se pretendía averiguar la repercusión que había tenido el curso en el uso de la evaluación nutricional, los equipos de apoyo nutricional o las consultas sobre nutrición en la práctica clínica y si habían participado en alguna asociación o conferencia de nutrición.

Resultados: La mayoría de los médicos que rellenaron la encuesta había aumentado el uso de las herramientas de evaluación nutricional y el tiempo dedicado a este tratamiento; asimismo, había aumentado el número de pacientes que recibieron tratamiento nutricional.

Conclusiones: El curso TNT ha resultado un modelo

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Recibido: 29-IX-2003.
Aceptado: 16-XII-2003

Results: The majority of physicians who completed the survey increased their use of nutrition assessment and time dedicated to nutrition therapy, and increased the number of their patients placed on nutrition therapy.

Conclusions: The TNT course has been shown to be an efficient model of clinical nutrition education for general physicians. The course should be considered as part of the training of medical residents.

(*Nutr Hosp* 2004, 19:28-33)

Keywords: *Clinical nutrition. Hospital malnutrition. Medical education. Nutritional assessment. Subjective global assessment.*

Introduction

Estimates of malnutrition among hospitalized patients at admission range from 20% to 55%^{2,3}. Among patients with normal nutritional status upon admission, approximately 50% may develop mild malnutrition while hospitalized⁴. One study found that no more than 19% of patients' medical records contained any information about nutritional status, and only 15% of patients were weighed even though a scale was available within 50 meters in 75% of cases¹. Malnutrition is correlated with higher morbidity, mortality, and health care costs, yet is infrequently addressed^{1,5,6}. Early nutrition intervention has been shown to reduce complications and to improve outcomes in surgical^{7,8}, pediatric⁹, and trauma patients¹⁰.

One reason why malnutrition is not addressed is a lack of nutrition education for physicians.¹¹ In the United States, 98% of medical schools report nutrition as a component of their education, yet most schools do not require a single course on nutrition¹². In Italy, final-year medical and dietetic students took a clinical nutrition test, with 76% of the dietetic students passing, compared to only 18% of the medical students. In contrast, 77% of medical students who had taken a clinical nutrition curriculum passed.¹³ In a study of fluid prescribing practices in Great Britain, only 56% of respondents reported checking fluid balance charts during daily rounds. Less than 50% of these physicians knew the sodium content of 0.9% saline solution or the daily sodium requirement, and 25% were misprescribing saline solution¹⁴.

Medical schools are beginning to respond to this knowledge gap. Great Britain now has a nutrition curriculum for all medical schools¹⁵. Both the University of Pennsylvania and the University of Arizona have increased their nutrition course requirements for medical students¹². The faculty at the University of Pennsylvania consists of dietitians and physicians from several departments. In 1991, 80% of surveyed graduating medical students at the University of Pennsylvania stated that their nutrition education was inadequate, whereas in 1998, only 10% stated that opinion¹⁶.

eficiente para la educación de los médicos generales en nutrición clínica. Este curso debería integrarse en la formación de los médicos residentes.

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Palabras clave: *Educación médica. Evaluación nutricional. Evaluación subjetiva general. Malnutrición hospitalaria. Nutrición clínica.*

Several nutrition experts have also responded to the dearth of nutrition education available for physicians by forming the Intersociety Professional Nutrition Education Consortium (IPNEC)¹⁷. Eight national societies and 3 credentialing bodies are represented in IPNEC. Its main objective is to establish educational standards for fellowship training of physician nutrition specialists (PNS). PNS are usually gastroenterologists, but physicians from any discipline may work towards this designation¹⁷. These specialists can then train other physicians on how to utilize nutrition assessment and therapy in patient care, an important but neglected area of physician education.

The lack of physicians with nutrition training is especially critical in Latin America. Latin America has approximately 500 million inhabitants (1996 estimate)¹⁸. The largest country, Brazil, has close to 200 million people¹⁸. The Director General of the Food and Agriculture Organization of the United Nations estimates that 54 million Latin Americans suffer from chronic malnutrition¹⁹. This is over 10% of the region's population. In parts of Brazil, child malnutrition is as high as 15%²⁰. Therefore, the need for physicians with nutrition knowledge is great. Dietitians are not always available to aid physicians in Latin America and it is crucial for physicians to be able to utilize nutrition assessment and therapy.

The Latin American Federation of Parenteral and Enteral Nutrition (FELANPE) partnered with Abbott Laboratories to develop Total Nutritional Therapy (TNT). TNT is a 2-day, 20-hour course with lectures, workshops, and case studies. The format was inspired by the Advanced Trauma Life Support (ATLS) course. ATLS is a 2-day course developed by the American College of Surgeons for physicians who do not routinely treat victims of trauma. ATLS training has been shown to benefit patients with serious but survivable injuries.²¹ Modeled on the successful format of ATLS, TNT seeks to improve physician knowledge of clinical nutrition through a 2-day course and to increase the use of nutritional therapy in clinical practice.

The TNT course was developed for physicians by physicians. It emphasizes small group activities that

promote interaction. It consists of 11 lectures, 5 workshops, 5 case studies, and a 20- chapter manual and is taught over a 2-day period. Table I lists the course content. Members of the FELANPE education board and Abbott Laboratories developed the course materials. The course is taught by 4 instructors and a course director. Instructors are physicians who have successfully completed the course and post-course test. The instructors emphasize the basic principles of the course. The course was piloted and audited in Mexico City, Mexico in April 1997. Through 2002, 317 TNT courses were offered in 16 Latin American countries and 8,214 physicians have completed TNT (table II).

Each course was limited to 32 participants to foster small group interactions and attention. Thirty days prior to each course, TNT course organizers mailed the course study materials, manual, and a pre-test to each participant. The format of the course alternated between lecture, small-group discussions on case studies, and workshops. The workshops provided actual practice with enteral and parenteral devices and procedures. Active participation in workshops and case study discussions was strongly encouraged. At the

end of the course, a post-course test was given. Instructors presented diplomas to participants with a score of 70% or higher.

The objectives of this study are to report the results of the surveys completed in 1999 and 2000, 6 months after TNT, to determine the impact of TNT on the awareness and knowledge of clinical nutrition and its impact on physician clinical practice.

Methods and Materials

Physicians were notified of the course offering by several methods. FELANPE and the nutrition societies of each country in FELANPE mailed invitations to their members. FELANPE advertised the course in its newsletter and in medical journals. Abbott representatives also informed physicians about the course.

During 1999 and 2000, TNT participants were surveyed 6 months after completing the TNT course in order to assess the impact that TNT had had on their medical practice (table III). The survey questions were about the physicians' routine use of nutrition assessment and nutrition consultations, use of nutrition support teams (NSTs), and membership in parenteral and

Table I
TNT Course Content

<i>Chapters</i>	<i>Lectures</i>	<i>Workshops</i>	<i>Case studies</i>
1. Nutritional Therapy	Malnutrition/Consequences		
2. Cost Benefit of Nutrition Therapy	Malnutrition/Consequences		
3. Body Composition	Nutrition Screening and Assessment	Nutrition Assessment	
4. Carbohydrates, Proteins, Lipids	Nutrient Needs	Fluid and Nutrient Requirements	
5. Vitamins/Trace Elements	Nutrient Needs	Fluid and Nutrient Requirements	
6. Water and Electrolytes	Nutrient Needs	Fluid and Nutrient Requirements	
7. Metabolic Response to Stress	Metabolic Response to Stress		
8. Nutrition in Critical Care	Early Enteral Nutrition Therapy		Critical Illness/Multiple Trauma
9. Cancer			Colorectal Cancer
10. Gastrointestinal Disease			Short Bowel Syndrome
11. Chronic Disease			Type 2 Diabetes, Chronic Obstructive Pulmonary Disease
12. Orders/Assessing Outcomes			
13. Enteral Nutrition	Early Enteral Nutrition Therapy		
14. Enteral Formulas	Formula Selection		
15. Gastrointestinal Access	Enteral Access	Enteral Access Devices	
16. Enteral Feeding Complications	Preventing Complications	Enteral Feeding Systems	
17. Parenteral Nutrition	Parenteral Nutrition Therapy		
18. Central Venous Access	Complications of Parenteral Nutrition Therapy	Central Venous Catheters	
19. Parenteral Complications	Complications of Parenteral Nutrition Therapy	Central Venous Catheters	
20. Home Nutrition Therapy	Summary: Optimizing Nutrition		

Table II
Number of TNT Courses and Participants by Country, 1997-2002

Country	Number of Courses	Number of Physicians Attending
Argentina*	27	671
Bolivia	1	31
Brazil*	56	1415
Chile*	13	265
Colombia*	57	1550
Costa Rica	12	277
Dominican Republic	5	142
Ecuador	18	508
El Salvador	14	480
Mexico*	55	1143
Panama	12	214
Paraguay	2	60
Peru	10	329
Puerto Rico	1	26
Uruguay*	15	543
Venezuela	19	560
Total**	317	8214

* Denotes country surveyed.

** Please note that these totals reflect the number of physicians who have taken the course from 1997 through 2002, not only the 3,025 physicians who were surveyed in 1999 and 2000.

enteral nutrition associations. The physicians were also asked if they had begun NSTs and if they had increased the time dedicated to nutrition therapy since attending the TNT course. These questions were included to aid in determining if the TNT course had had an impact on their clinical practice. The 6-month follow-up surveys were mailed to the 3,025 physicians in Argentina, Brazil, Chile, Colombia, Mexico, and Uruguay who had taken the TNT course during 1999 or 2000. Survey results were compiled in Epi Info, version 6.04 (Centers for Disease Control, Atlanta).

Results

Six hundred seventy five physicians completed the 6-month follow-up surveys in 1999 and 2000. The 6 countries surveyed hosted 70% of the TNT courses offered through 2002 (table II). The response rate was 22% (675/3,025). Twelve of the physicians were from Argentina; 348 were from Brazil; 60 were from Chile; 50 were from Colombia; 129 were from Mexico; and 76 were from Uruguay.

Responses to 8 of the questions are shown in Figure 1. Seventy-nine percent of the physicians reported increasing the time that they dedicated to nutrition therapy in their medical practice and 78% reported including nutrition assessment in their practice after completing the TNT course. Sixty-seven percent increased the percent of patients placed on nutrition therapy. Twenty-nine percent became new parenteral and enteral nutrition society members. Thirty-seven

percent reported creating nutrition support teams (NSTs) and 27% joined NSTs after attending the TNT course. Almost half (49%) of the physicians increased NST consultations.

Discussion

The results of this survey completed 6 months after the TNT course illustrate important changes in the clinical practice of physicians. Almost 80% of the physicians increased the time dedicated to nutrition therapy and included nutrition assessment in their clinical practice. More than two-thirds increased the number of patients they placed on nutritional therapy. Many physicians joined a nutrition society or attended a nutrition conference, and their use of nutrition support teams (NSTs) increased. Based on their TNT training, physicians should be more likely to intervene early with nutritional therapy and thereby prevent complications, decrease morbidity, mortality, and reduce health care costs. Early nutrition intervention has demonstrated these benefits in previous studies^{1,22}. The use of NSTs has also been shown to reduce health care costs^{23,24}.

In many hospitals, new NSTs were formed by TNT graduates. One university hospital incorporated the TNT course as part of its medical residency program. The TNT course has also promoted the development of nutritional guidelines and protocols and stimulated research on malnutrition. Most importantly, the survey results indicate that TNT graduates are utilizing their nutrition knowledge in patient care.

Over 8,000 physicians have been trained in 16 Latin American countries since April 1997. The TNT program continues to be offered in many countries and was recently updated (TNT 2.0). TNT webmaster is already available at <http://tninfo.net>. From the 3,025 surveys originally mailed during 1999 and 2000, 22% of participants responded. This response rate is comparable to other researchers' findings with surveys done with one mailing^{25,26}. Changes in address, difficulties with electronic or postal mail, only one mailing sent, and physicians' hectic work schedules may be reasons why more physicians did not respond. It is hoped that with a web site, more responses may be obtained for the 6-month follow-up survey, in the future.

Summary

Just as the ATLS course has been successful in reducing mortality from trauma²¹, the TNT course may help to remedy the gap in physician nutrition education. By becoming more aware of nutrition therapies and support teams, physicians may incorporate these modalities into their clinical practice and impact malnutrition among hospitalized patients. Physicians who have completed the TNT course can incorporate what they have learned in their practice and thereby help to reduce malnutrition and its effects.

Table III
TNT Participant Follow-up Survey after Six Months

	<i>First</i>	<i>Middle</i>	<i>Last</i>
Name			
Is there a nutrition support team (NST) in your hospital?	<input type="checkbox"/>	1 = Yes; 2 = No	
If yes, was it created after you took TNT?	<input type="checkbox"/>	1 = Yes; 2 = No	
Are you a member of the NST?	<input type="checkbox"/>	1 = Yes; 2 = No	
If yes, did you become a member after you took TNT?	<input type="checkbox"/>	1 = Yes; 2 = No	
If not, have you asked the NST for more consultations?	<input type="checkbox"/>	1 = Yes; 2 = No	
Have you included nutrition assessment routinely in examinations?	<input type="checkbox"/>	1 = Yes; 2 = No	
Have you increased the number of patients you place on nutrition therapy?	<input type="checkbox"/>	1 = Yes; 2 = No	
How many patients (on average) do you see on nutrition therapy per day?	<input type="checkbox"/>		
Do you consult your TNT material in your daily practice?	<input type="checkbox"/>	1 = frequently; 2 = moderately; 3 = rarely	
Are you a member of your country's Parenteral and Enteral Society?	<input type="checkbox"/>	1 = Yes; 2 = No	
If yes, did you become a member after TNT?	<input type="checkbox"/>	1 = Yes; 2 = No	
After you took TNT, did you attend any nutrition congresses?	<input type="checkbox"/>	1 = Yes; 2 = No	
Which one?			
Have you increased the time you spend on nutrition therapy?	<input type="checkbox"/>	1 = Yes; 2 = No	
If yes, how much time are you now spending?	<input type="checkbox"/>	1 > 80%; 2 = 50-79%; 3 = 30-50%; 4 < 29%	
How would you rate TNT's impact on your routine nutritional practice?	<input type="checkbox"/>	1 = very important; 2 = important; 3 = not important	
Would you like to receive a newsletter with TNT information?	<input type="checkbox"/>	1 = Yes; 2 = No	
Date of TNT course: __ / __ / __	City: _____		
Street address: _____			
City: _____	State: _____		
Country: _____	Zip code: _____		
Telephone: _____	Fax: _____	E-mail: _____	
Additional Comments: _____			

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