International Journal of Advanced Biotechnology and Research (IJBR)
ISSN 0976-2612, Online ISSN 2278–599X,
Vol-8, Issue-2, 2017, pp1433-1439
http://www.bipublication.com

Research Article

Development and evaluation of an original flow chart for achieving proper nutritional intervention by the nutrition support team in different hospital wards

Kenichi Iwasaki[1,7], Aya Naganuma[2], Yuko Miyasato[2], Yoshito Suzuki[2], Machiko Ogawa[3], Saki Chida[3], Yuko Sekiya[4], Yuichi Kaizuka[5], Nagato Otsuka[6], Masato Moritani[1], Toshifumi Wada[1], Kenji Katsumata[7] and Akihiko Tsuchida[7]

[1]Department of Gastrointestinal Surgery, [2]Department of Pharmacy, [3]Department of Nutrition, [4]Nursing Department, [5]Department of Clinical Laboratory, and [6]Department of Rehabilitation, Nishi Tokyo Chuo General
[7]Department of Gastrointestinal and Pediatric Surgery, Tokyo Medical University
Kenichi Iwasaki; MD, PhD, Department of Gastrointestinal Surgery
E-mail; iwa0715@gmail.com
AyaNaganuma; MSc, Department of Pharmacy
E-mail; aya.naganuma.tokyo@gmail.com
Yuko Miyasato; MSc, Section Manager of the Department of Pharmacy
E-mail; y_miyasato@tmg.or.jp
Yoshito Suzuki; MSc Deputy Section Manager of the Department of Pharmacy
E-mail; y_suzuki02@tmg.or.jp
Machiko Ogawa; Principal of the Department of Nutrition
E-mail; m_ogawa@tmg.or.jp
Saki Chida; Deputy Manager of the Department of Nutrition
E-mail; s_chida2@tmg.or.jp
Yuko Sekiya;MSc, Section Manager of the Nursing Department
E-mail; y_sekiya@tmg.or.jp
Yuichi Kaizuka; MSc, Principal of the Department of Clinical Laboratory
E-mail; kaiduka@tmg.or.jp
Nagato Otsuka; MSc, Section Manager of the Department of Rehabilitation E-mail; n_ootsuka@tmg.or.jp
Masato Moritani; MD, PhD, Section Manager of the Department of Gastrointestinal Surgery, E-mail; m-masato.gemini3000@ezweb.ne.jp
Toshifumi Wada; MD, AD of Nishi Tokyo Chuo General E-mail; kiwasaki0715@yahoo.co.jp
Kenji Katsumata; MD, PhD, Professor of Department of Gastrointestinal and Pediatric Surgery, E-mail; k-katsu@tokyo-med.ac.jp
Akihiko Tsuchida; MD, PhD, Senior Professor of Department of Gastrointestinal and Pediatric Surgery, E-mail; akihikot@tokyo-med.ac.jp

ABSTRACT:

We evaluated the operation of our original flow chart for NST intervention inthe different wards of Nishi Tokyo Chuo General Hospital using specific items for the extraction of target patients. Our aims were to increase the number of proper NST interventions and to deepen understanding of clinical nutrition and NST activities. Our evaluation indicated that a clear understanding of NST activities and the complete support of multiprofessionals are crucial for achieving proper NST intervention as well as for recognizing the importance of the NST.

INTRODUCTION

Nutritional management has recently been recognized as an important basic medical care common to all treatments, and the necessity of nutritional therapy for various pathological

conditions has been proposed. In fact, 8%-38% of new inpatients have been reported to be already in a state of malnutrition at the time of admission, and their nutritional status is further aggravated by hospitalization (1).Importantly, undernourishment is associated with a delay in wound healing, reduction of immune function, and an increase in the incidence of complications (2,3, 4, 5). Some studies also show that decreased food intake during hospitalization, is associated to increasing morbidity and mortality (6, 7). In addition, patients with malnutrition are frequently readmitted to the hospital after discharge (8) which affects the cost of hospitalization as well (9, 10). Based on this background, it is important to accurately evaluate the nutritional status of patientsand subsequently initiate dietetic intervention from an early phase for patients requiring intervention by the Nutrition Support Team (NST) to improve their pathological condition and prevent complications (11).

Followed by the creation of parenteral nutrition (PN), NSTs were initially formed in the 1960s (12). Traditionally, NST consists of a physician, registered nurse, registered dietitian nutritionist(RDN) and clinical pharmacists. (12). In Japan, the concept of comprehensive nutritional management by the NST (i.e., by multiprofessional teams) has incrementally spread since 2001, and hospitals with theirown NST have been gradually increasing. Since the approval of the addition of medical remuneration points for the NST in 2010, there has been an accelerated increase in the number of NST-operating hospitals.Consequently, an excellentNST that provides high-quality nutritional management has become a requirement.

Nishi Tokyo Chuo General Hospital is an acute-phase hospital with 270 beds (medical remuneration points of the NST is added to 174 beds) located in the center of Tokyo.Request-type and all-department-type NSTs have been operatingat Nishi Tokyo Chuo General Hospital since 2007. As for hospital features, although considered as an acute-phase hospital, Nishi Tokyo Chuo General Hospital consistently aims to establish a total patient support system consisting of community-based medical care from admission to care at home. The NST Nishi Tokyo Chuo General Hospital is composed of 2 physicians who have completed training in total nutrition therapy (TNT), 4 dietitians including 2 registered dietitians exclusive for anNST certified by the Japanese Society for Parental and Enteral Nutrition, 8 nurses,2 pharmacists, 1 clinical laboratory technologist, 1 occupational therapist, and 1 speech-language-hearing therapist. Conferences are held weekly utilizing information collected by link nurses allocated to the wards before the rounds. However, the number of requests has been leveling off over the last several years, indicating that the NST activities have either remained stagnantor slowed down. Aiming at increasing the number of proper interventions by the NST, we developed and evaluated the operation of our original flow chart for NST intervention in different wards of Nishi Tokyo Chuo General Hospital.

Objective

At Nishi Tokyo Chuo General Hospital, NST-target patients are identified during nutrition screenings on admission. Even if the nutritional status is not reduced, NST intervention is proposed for patients judged as being at a treatment-associated highrisk as a basic policy.

The extraction criteria of patients for NST interventionwere as follows: 1) a serumalbumin level of 2.5 mg/dL or lower on admission, 2) poor nutritional status, 3) inability to ingest food, and 4) the presence of a bedsore. However, many specific items of these criteriaremain unclear, and active extraction of target patients was difficult because of the possibility of subjective judgment.To increase the number of proper interventions by mechanical extraction of target patients, we developed and evaluated the operation of our original flow chart in different wards of Nishi Tokyo Chuo General Hospitalusing specific extraction items. Moreover, we conducted a survey to investigatethe changes in the number of NST interventions and the impressions of using the

flow chart to clarify its effectiveness.

Methods

The results of the survey wereanalyzed by comparing the total number of interventions and the number of wards involved between the period from April 2014 to December 2014 when a flow chart was not used and the period from April 2015 to December 2015 when our original flow chart (**Table 1**) was used. In addition, a questionnaire survey on the NST target patient extraction method using the flow chart was conducted among link nurses of the different wards.

In the extraction of NST target patients by the link nurses of the different wards, patients with hypoalbuminemia (≤ 2.5 mg/dL) were extracted by the Clinical Laboratory Department, and their list was distributed to the wards. Referring to the list, the target patients were extracted using the prepared flow chart, and these patients underwent NST intervention after obtaining the consent of their attending physicians.

The questions for the link nurses of the different wards in the questionnaire survey regarding the flow chart were related to following areas: 1) usability of the flow chart, 2) remembering tosubmitthe flow chart or not, 3) possibility of filling in the chart at intervals between ward duties, 4) understanding of the conditions of the NST target patients, 5) ease of requesting an intervention from the attending physicians, and 6) other matters, opinions, and impressions.

RESULTS

The total numbers of new interventions by the NST in 2014 and 2015 were 153 and 144, respectively. In the comparison of the number of interventions among the wards, the number increasedin the cardiovascular (E2) and orthopedic (E5) wards at the rates of 153.9% and 114.3%, respectively. The number of interventions decreased in the internal medicine (E3) and gastroenterology (E4) wards at the rates of 0.07% and 40.4%, respectively (**Figure 1**).

In the questionnaire survey on the flow chart forthe link nurses of the different wards, 62% responded that the flow chart was easy to use, none of the nurses described the flow chartas hard to use, and 23 of the nurses did not forget to submit the flow chart. Although all of the nurses considered that filling in the flow sheet duringtheir ward duties interfered with their work, 75% of the nurses could fill in the flow sheet if they tried to make time(**Figure 2**).

With regard tounderstanding the conditions of the NSTtarget patients, 85% felt that they were easy to understand. Regarding the ease of requesting an intervention from the attending physicians, 31%responded that it was easy (**Figure 3**).

In terms of other assessments about the flow chart, some opinions were positive such as ‘very easy to understand’, ‘the reason for intervention is specific, which is good’, and ‘extraction was easy because the necessity of intervention can be judged just by checking the chart’.Other opinions indicated the need for improvements such as ‘it is convenient but I want it easier to use’, ‘classification of detailed items was unclear in some cases’, and ‘I want more specific target conditions’. Regarding the amount of work, there were various responses such as ‘it can be performed during duties because it requires only checking’, ‘it is likely to be forgotten when night duties overlap’, ‘it takes time because more than half of patients are likely to be included into the targets’, ‘there is no time to fill in the chart because I am busy with my other duties’, and ‘some physicians do not prefer having an NST intervention’.

DISCUSSION

The European Society for Clinical Nutrition and Metabolism and the American Society of Parenteral and Enteral Nutrition recommends for early and systematic screening of all hospitalized patients for malnutrition (13). According to this the NST of Nishi Tokyo Chuo General Hospitalholds a weekly conference, and determines and proposes the energy requirement, nutrient distribution, water amount, and micronutrient components of the patients for intervention. The energy requirement is determined by calculating the basal metabolic rate using the Harris-Benedict equation,and then multiplying by the activity and stress factors in

consideration of the somatometry values, blood chemistry findings, energy intake, and motivation to eat immediately before the intervention (14). To solve the nutritional problems of individual patients, such as eating and swallowing disorders, as well as other conditions/situations that may be affected by nutrition such as bedsores, malignant and metabolic diseases, mental manifestations (e.g., depression and delirium), adverse effects of drugs, and family and social support, various kinds of advice are listed.These include changes in the food form and diet, addition of supplements, evaluation and rehabilitation of swallowing, denture adjustment and oral care, changes in the content of the infusion solution, and administration of trace elements.These are proposed during rounds.

However, in the actual state, the intention of the NST may not be sufficiently understood by the attending physicians and ward nurses (15),thus the intervention is not reflected.For example, even though changes in the food nutrients are proposed during the NST rounds, the same food nutrients are administered at the rounds in the following week. One obvious reason may be the lack of recognition of the importance of nutritional management.

Some situations that may interfere with the NST activities include differences in interest for nutrition and in recognition of the importance of nutrition between the NST members and the general medical care staff who do not belong to the NST.There are also differences in understanding knowledge of clinical nutrition. In fact, there is no opportunity for physicians in Japan to systematically learn clinical nutrition in postgraduate education unless they are interested in nutrition and actively participate in nutrition educational programs, such as TNT (16) and educational seminars (17).

A system for extracting target patients from different viewpoints by various professionals in addition to receiving an active request for NST intervention by physicians is ideal.However, the actual status may be markedly deviated because of the ‘no’ answer given to the following question: ‘Is the NST functioning?’.Also, in the questionnaire survey,there were responses stating that ‘It is unclear how the NST performs its activity’ and ‘opinions of the NST are not transmitted to the attending physicians in many cases’(18). Considering that the development of an original flow chart for the different wards of Nishi Tokyo Chuo General Hospital would likely increase the number of NST interventions, and that verification of the effects of the NST activities would contribute to increasingthe number of requests and eventual spreadof NST activities, we placed the flow chart into operation.

For the reactions and opinions regarding this attempt to operationalize the use of the developed flow chart, the cardiovascular (E2) and orthopedic (E5)wards previously expressed lessinterest in the NST based on the results of questions 1, 4, and 6 of the questionnaire survey.However, understanding of the NST was consequently deepened by the use of the flow chart,resulting in an increase in the number of NST interventions. This may be due to the fact that the flow chart content for the extraction of target patients was specifically and clearly presented unlike before when a flow chart was not used. The responses to questions 2, 3, 5, and 6 clarified that many NST link nurses perform NST duties which takes their time from intervals between other assignments, resulting in insufficient cooperation with the attending physicians. Inthe gastroenterology(E4) ward, the linkage between the nurses and the attending physicians became weakeras the physicians in charge changed, resulting in a decrease in the number of NST interventions.

The operationalization of the developed flow chartalso clarified the current status of nurses,showing that they have diverse roles in the NST and that their work content is not well organized. These findings indicate the importance of increasing the efficiency of link nurses in terms of their duties and strengthening the cooperation not only between link nurses and attending physicians but also among multiprofessionals. However, NST members (e.g., registered dietitians and pharmacists)visit the wards and give advice only during rounds and upon request.This was felt as a fence separating the wards according to previous

opinions (16), indicating that many problems remain regardingmultiprofessional cooperation in nutritional management in different hospital wards.

The introduction of the developed flow chart may be useful for clarifying the specific reasons for the NST intervention.However, the flow chart needs to be regularlyrevised and improved to enable link nurses to simply fill in the forms withthe least possible disturbance on their work efficiency. In addition, it was suggested that the smooth cooperation among multiprofessionals including attending physicians is necessary for accomplishing NST activities.To achieve this, Nishi Tokyo Chuo General Hospital is planning to carefully and more thoroughly introduce the flow chart, explain the importance of nutritional management through various activities, such as study meetings held by the NST Committee and publishing NST communications, and undertake more NST activities for the entire hospital to increase consciousness of the importance of nutritional management as an adjunct therapy. Subsequently, the NSTaimsto support patients from different health aspects and furtherimprove theoverall nutritional management in the hospital.

CONCLUSION

We evaluated the operation of ouroriginal flow chart for NST intervention inthe different wards of Nishi Tokyo Chuo General Hospital using specific items for the extraction of target patients. Our aims were to increase the number of proper NST interventions and to deepen understanding of clinical nutrition and NST activities. Our evaluation indicated that a clear understanding of NST activities and the complete support of multiprofessionals are crucial for achieving proper NST intervention as well as for recognizingthe importance of the NST.

REFERENCES

1. Shang E, Hasenberg T, Schlegel B, Sterchi AB, Schindler K, Druml W et al. A European survey of structure and organization of nutrition support teams in Germany, Austria and Switzerland. ClinNutr.2005;24:1005-13
2. Hickey MM, Munyer TO, Salem RB, Yost RL. Parenteral nutrition utilization: evaluation of an educational protocol and consult service. JPEN J Parenter Enteral Nutr.1979;3:433-37
3. Dalton MJ, Schepers G, Gee JP, Alberts CC, Eckhauser FE, Kirking DM. Consultative total parenteral nutrition teams: the effect on the incidence of total parenteral nutrition-related complications. JPEN J Parenter Enteral Nutr.1984;8:146-52
4. Kubota T, Hiki N, Nunobe S, Kumagai K, Aikou S, Watanabe R, et al. Significance of the inflammation-based Glasgow prognostic score for short and long term outcomes after curative resection of gastric cancer. J Gastrointest Surg.2012;16:2037-44
5. Kubota T, Hiki N, Sano T, Nomura S, Nunobe S, Kumagai K, et al. Prognostic significance of complications after curative surgery for gastric cancer. Ann SurgOncol.2014;21:891-98
6. Naber TH, Schermer T, de Bree A, Nusteling K, Eggink L, Kruimel JW et al. Prevalence of malnutrition in nonsurgical hospitalized patients and its association with disease complications. Am J ClinNutr.1997;66:1232-39
7. de Ulibarri Pérez JI, Picón César MJ, GarcíaBenavent E, Mancha Alvarez-Estrada A. Early detection and control of hospital malnutrition. Nutr Hosp.2002;17:139-46
8. CallejaFernández A, Vidal Casariego A, Cano Rodríguez I, Ballesteros Pomar MD. Malnutrition in hospitalized patients receiving nutritionally complete menus: prevalence and outcomes. Nutr Hosp.2014;30:1344-49
9. M.I.T.D. Correia, D.L. Waitzberg. The impact of malnutrition on morbidity, mortality, length of hospital stay and costs evaluated through a multivariate model analysis. ClinNutr.2003;22:235-39
10. S.L. Lim, K.C.B. Ong, Y.H. Chan, Loke WC, Ferguson M, Daniels L. Malnutrition and its impact on cost of hospitalization, length of stay, readmission and 3-year mortality. ClinNutr.2012; 31:345-50
11. Chong PF, Paraidathathu T. Effects of a

nutrition support team on clinical outcomes, metabolic complications and electrolyte abnormalities in patients receiving parenteral nutrition. Asia Pac J ClinNutr.2013;22:548–56

12. A.S.P.E.N. Practice Management Task Force, Delegge M, Wooley JA, Guenter P, Wright S, Brill J, et al. The state of nutrition support teams and update on current models for providing nutrition support therapy to patients.NutrClinPract.2010;25:76-84
13. White JV, Guenter P, Jensen G, Malone A, Schofield M. Academy of Nutrition and Dietetics Malnutrition Work Group A.S.P.E.N. Malnutrition Task Force A.S.P.E.N. Board of Directors Consensus statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: Characteristics recommended for the identification and documentation of adult malnutrition (undernutrition) J AcadNutr Diet.2012;112:730-38. Erratum in J AcadNutr Diet.2012;112:189
14. Harris JA, Benedict FG. A biometric study of basal metabolism in man. Washington, DC: Carnegie Institution. 1919. (Publication no. 279)
15. J.P. McWhirter, C.R. Pennington. Incidence and recognition of malnutrition in hospital. Br Med J.1994;308:945-48
16. Inoue Y. Nutrition education program for physicians: Effectiveness and future prospects of TNT. Jpn J ClinNutr.2005;106:710-15
17. Takeyama Y, Ohyanagi H. Current state and future prospects of setting NST in medical care facilities in Japan. J ClinExp Med.2006;218:371-75
18. Takeshi K, Fumiko O, Toru T, Hiroya I, Masayo G, Makiko K et al. The doctor's role in the multiprofessioncooperative nutritional management in the ward of gastroenterology. JJpnSoc Parent and Enteral Nut.2015;30:1259-62

Figure1: The comparison of the number of interventions among different wards.

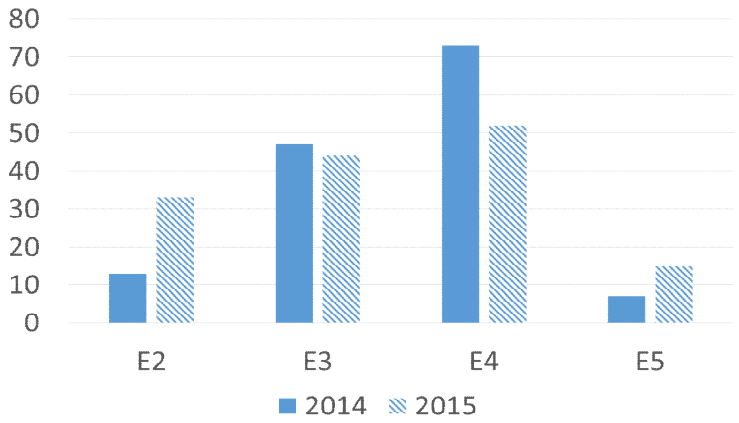
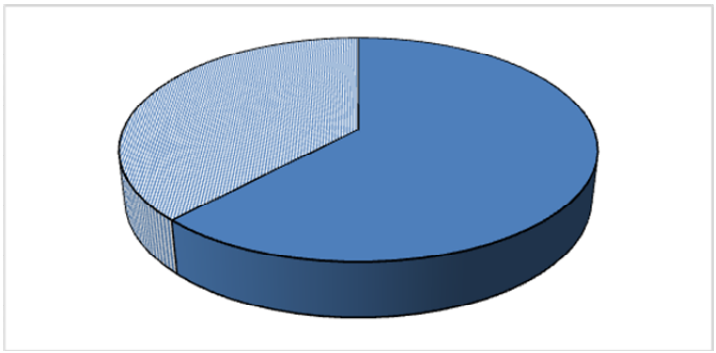
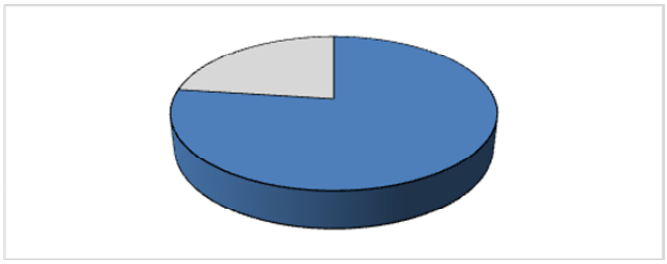


Figure2: Results of the questionnaire survey on the flow chart for the link nurses of different wards (1-3).

1) Was the flow chart easy to use?



2) Have you ever forgotten to submit the flow chart?



3) Did filling the flow chart during the ward dutiesinterfere with your work?

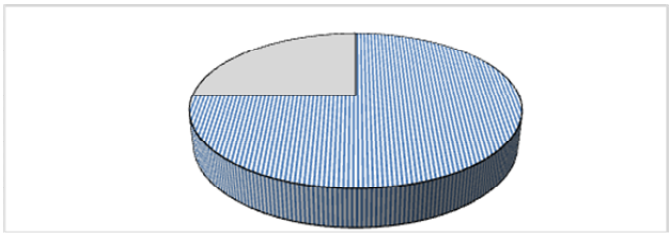
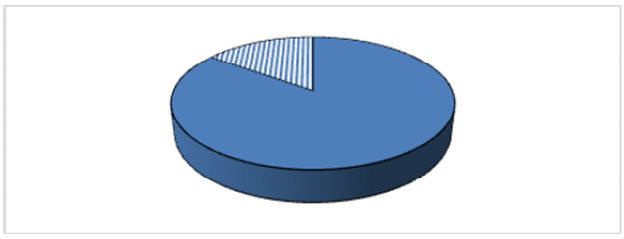


Figure3: Results of the questionnaire survey on the flow chart for the link nurses of different wards (4, 5).

4) Was the flow chart easy to understand in terms of the conditions for the NST target patients?



5) Was it easy to request the attending physicians for an NST intervention?

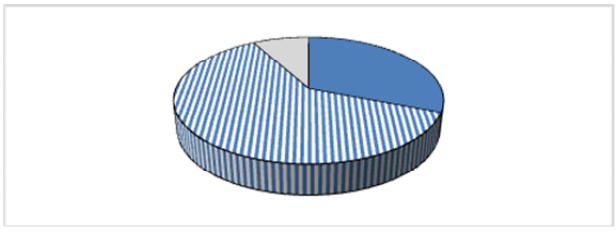


Table1: Our original flow chart in Nishi Tokyo Chuo General Hospital for NST intervention.

Original Flow Chart						**Exclusion Criteria**			**Specific Issues of Malnutrition**						YES / NO	
Patients with hypoalbuminemia						※any case below is excluded			※any case below can be an indication for NST intervention						※MUST	
ID	department	name	sex	age	serum albumin (mg/dL)	patient in the terminal stage	patient with a short stay	patient to be discharged in the near future	patient with deglutition disorders	patient under tube feeding	patient with abrosia for	patient lost over 3kg/month	patient with reduced dietary intake	Others. please write bellow	permission of attending physician	ready for NST?
Patient with decubitus ulcers																
※ Any patient with decubitus ulcers is eligible for NST intervention.																
ID	name	Others. ※ Please write the reason why NST intervention is needed.														