The Nutrition Assessment and Care for the Elderly in Japan

Michiko Sugiyama,[†] Akio Nishimura,[*] Hideo Koyama[*]

The NCM for the Elderly Project, Tokyo, Japan
National Institute of Health and Nutrition,[*] The National Institute of Health Service Management,
Tokyo, Japan

ABSTRACT

In Japan, a new nursing insurance system was enforced in April 2000, where premiums were paid according to the level of necessary care. Our project, Nutrition Care and Management(NCM) for the elderly was started in 1995, funded by the Ministry of Health and Welfare of Japan. The NCM project was to provide appropriate nutrition care for the elderly and to see that it effectively functions as part of the health care services. There were 4 stages to the project : the first stage was to find out the PEM status among the elderly patients in hospital and home-care settings in Japan. The 2nd stage was to develop and evaluate nutritional assessment methods, anthropometry, resting energy expenditure measuring methods using of portable indirect calorimeter, and the convenient protein energy intake assessment methods, etc. for the elderly patients with PEM risk. The 3rd stage was to examine the effectiveness of the nutrition care plan induced of protein energy supplement and team care in improving nutrition among the elderly patients. The last stage was to develop the NCM set for the elderly patient based on the past three years of scientific evidence. It is expected that the NCM system for the elderly will provide adequate nutritional care management, improve the elderly care environment and create effective resource management. (*J Community Nutrition* 2(1) : 12~26, 2000)

KEY WORDS : elderly · protein-energy malnutrition · nutritional care and management.

Introduction

The maintenance and improvement of nutrition status are the basic elements to human beings in order to live better and to die better. Protein is the main component of human body, and energy keeps daily acitivity. These elements that originate from food intake, maintain the metabolism of the human body. Since nutrition plays an important role in humans' health and life, nutrition care service to the community is an improtant part of health care services.

In Japan, the average length of stay for acute care hospitals is 44.2 days, which is the longest among OECD countries. The primary reason is an increase of elderly patients, which make up 48% of all hospitalized patients. In order to shorten the length of stay, introducing fixed payment for individual patients is under consideration. In addition, in April of year 2000, long-term care system was started. About 2.8 million elderly people will be evaluated for their eligibility to receive long-term care. Half of them will receive institutional care and half will receive home care. At the time of health care reform, food service for the elderly in institutions and home care are not under long-term care but a part of community care.

In part of elderly care, nutrition service to maintain and improve nutrition status of the elderly is necessary. To do so, it is necessary to identify the nutrition problems of the elderly at an early stage. In addition, in order to

[†]Corresponding author : Michiko Sugiyama, The NCM for the Elderly Project, 1-23-1 Toyama Shinjuku, Tokyo 162-8636, Japan
Tel : 81-3-3203-5722, Fax : 03-3203-5605
E-mail : sugiyama@nih.go.jp

provide suitable food services and nutrition supplements, it is necessary to be systemized and to educate the care provider, the community and the community institutions by providing information.

PEM among the Elderly

Protein-energy malnutrition(PEM) is a major nutrition problem among the elderly in home care settings and other care institutions(Seiler & Stahelin 1999). In the United States, PEM was recognized as Hospital Malnutrition in the 70's and was regarded as a social problem (Bistrian et al. 1974, 1976). According to current hospital surveys, PEM among the elderly was 30 to 50% among acute and long term care hospital patients(Bistrian et al. 1976 ; Koyama & Sugiyama 2000)(Table 1). Moreover, PEM patients in general, ICU, rehabilitation wards are seen to extend their length of stay (Koyama & Sugiyama 2000)(Table 2). However, patients under the DRG, who receive nutrition care, are seen to reduce their length of stay significantly(Gallagher-allred et al. 1996 ; Tucker & Miguel 1996 ; Sheils et al. 1999).

Long term energy and protein depletion and the stress experienced from diseases and surgeries are common among elderly patients. This also causes the patients to lose weight and decrease in the level of plasma albumin. Once patients suffer from PEM, there will be a decrease in daily life activity, an increase of infection rate, longer length of stay in institutions, increase of medication, decrease in life span(NSI 1992 ; Rush 1993)(Fig. 1).

With that in mind, it is necessary to introduce nutrition screening and identify PEM risk individuals among institution and home care elderly patients. Then, it is necessary to assess each individual elderly patients and make out a care plan for effective nutrition care and management(NCM). However, the practice of nu-

Table 1. PEM among the elderly patients

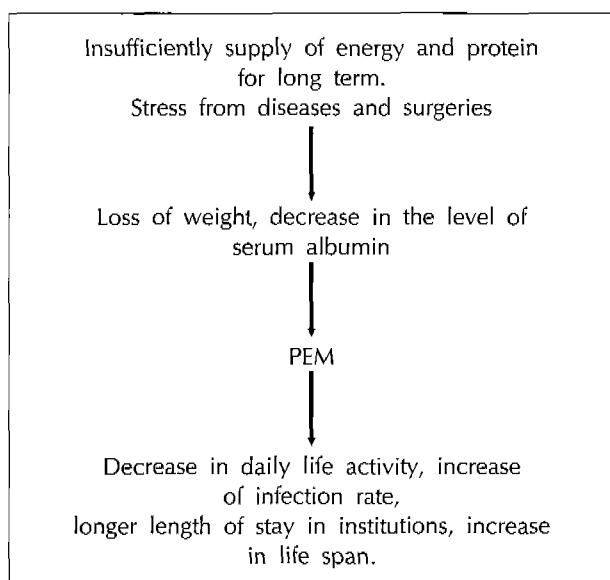| Authors	Year	Subjects	No.	%
Bistrian BR	1974	General surgery	131	43
Bistrian BR	1976	General medicine	251	44
Hill GL	1977	General surgery	105	50
Merritt RJ	1979	Pediatric(acute)	129	36
	1979	Pediatric(chronic)	129	47
Weinser RL	1979	All inpatients	134	48
Willard MD	1980	General medicine	200	32
O'Leary JR	1982	All inpatients	1,113	86
Biena R	1982	Adult patients	93	28
	1982	Elderly patients	59	61
MacEvoy	1983	Acute geriatric patients	294	11
Kamath SK	1986	33 acute-hospital	3,047	40
Coats KG	1988	General medical hospital	228	38
Mcwhirter JP	1994	University hospital	400	40
Potter K	1995	Acute geriatric hospital	325	68
Giner M	1996	ICU	129	43
Mears E	1996	Internal medicine, surgical medicine, OB/GY	95	50
Savio GCD	1996	Elective total hip replacement patients	103	66
Chima CS	1997	General medicine	173	32
Rady MY	1999	Cardiovascular surgery	2,743	12
Flaccadori E	1999	Acute renal failure	309	42

trition care in Japan is actually an extension of food services which follows the Recommended Dietary Allowance.

The NCM Project for the Elderly in Japan

Our project, Nutrition Care and Management (NCM) for the elderly, was developed to plan and promote nutrition care and management system in care-settings from 1995 funded by the Ministry of Health and Welfare of Japan (Matsuda 1996-9 ; Sugiyama & Koyama 1998). The NCM project was developed to provide appropriate nutrition care for the elderly to

Table 2. PEM and average length of stay in hospital patients

Authors	Year	Subjects	Average length of stay	
			Normal patients	PEM patients
Bastow MD	1983	Fructured neck femur	10.0	12.0
Epstein AM	1987	Bone marrow transplant	21.5	30.1
Weber TR	1995	Fundoplication	1.8	18.0
Giner M	1996	ICU(pri)	6.3	8.1
		(peri)	3.5	9.5
		(post)	19.8	27.1
Finestein HM	1996	Stroke rehabilitation	44.9	58.9
Bernstein B		Rehabilitation(elderly)	x	5.4+x
Savio GCD	1996	Total hip replacement	n	2×x
Chima M	1997	General patients	4.0	6.0
Fiaccadori E	1999	Acute renal failure	23.5	34.8
Rady MY	1999	Cardiovascular surgery	11.6	17.9

Insufficiently supply of energy and protein for long term.
Stress from diseases and surgeries

↓

Loss of weight, decrease in the level of serum albumin

↓

PEM

↓

Decrease in daily life activity, increase of infection rate, longer length of stay in institutions, increase in life span.

Fig. 1. Protein-energy malnutrition(PEM) among the Elderly.

see that it effectively functions as part of the health care service. The NCM for the elderly system consisted of nutritional screening, assessment, nutritional care plan(nutrition support, nutrition education and multidisciplinary nutrition care), monitoring, evaluation and quality control in institutionalized and home-care settings in Japan(Matsuda 1996~9 ; Sugiyama & Koyama 1998)(Fig. 2). Moreover, NCM should be a tool to improve quality of life. Thus, constant evaluation of health outcome,

quality of care and cost of service are important. The goal of NCM is to allow the elderly to maximize their ability to carry out their daily activities.

The 4 stages of the project were 1) to examine PEM status among the elderly patients in various care-settings in Japan, 2) to develop and evaluate nutritional assessment methods for the elderly patients at PEM risk(ex. Anthropometrics, The measurement of resting energy expenditure(REE) by Hosoya's portable indirect calorimeter, and The Convenient Protein Energy Intake Assessment Method), 3) to examine the effectiveness of the nutrition care plan in order to improve the PEM status among elderly patients, and 4) based on the past three years of scientific evidences, to develop the Nutrition Care and Management(NCM) set(manual, flow chart, check list) for the elderly patients and examine the feasibility of the NCM sets.

PEM Status among the Elderly in Various Health-Care Settings

Thirty-nine percent of the 695 female patients and 43% of the 306 male patients examined in 15 geriatric hospitals from northern
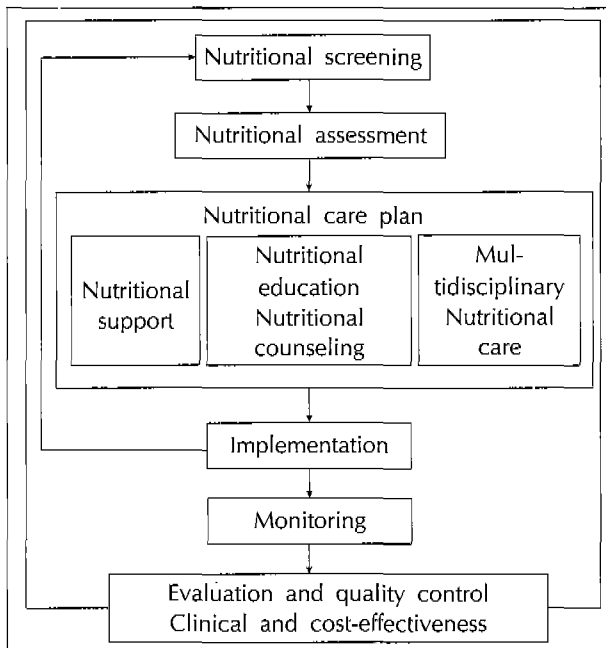
Fig. 2. Nutrition care and management(NCM) system.
Goal : To improve the nutrition status and to upgrade the quality of life. To extend the daily self reliant ability for the elderly to a maximum extent. Requirement : Exclude cases where QOL upgrading occurs in priority to the improvement of nutrition.
Structure :

1) Nutrition screening : A process to determine the subjects nutritional risk and to find out the related causes. To be implemented within 24-72hours for sub acute and long term care settings and within 24 hours for acute care centers.

2) Nutrition assessment : Process for evaluating the magnitude of nutrition risk and serves as an improvement index. To evaluate nutrition status directly(clinical diagnosis, clinical examination, physical examination) and indirectly(food survey). To measure resting metabolic rate prior to energy supplement.

3) Nutrition care plan : Individual care plan made up after discussions with all care givers and is written on paper. Items include "when", "where", "who", "what" and "how" for implementation. The following are the main 3 items : ① Nutrition supplement : To determine the proper amount of energy or nutrition supplement and the proper implementation method(oral food, oral food & nutritional food, enteral nutrition, peripheral nutrition). The energy supplement is determined according to the BMR. ② Nutrition education : Successful communication with the subjects is assumed. Knowledge about PEM improvement, Change of attitude, Life style modification. ③ Multiple disciplinary nutrition care : Nutrition status is lar-

gely affected by the physical condition, mental condition, economic status, and social problems. Therefore it is necessary to involve not only nutritionist but also physicians, dentists, nurses, public health nurse, pharmacist, social workers, physical therapists, clinical psychologists etc.

4) Monitoring : A process to determine whether there is a problem with the care plan and how it is implemented(non-compliance by the subjects, complications, inappropriate nutrition supplement, support problems etc.). Problems should be addressed immediately. If the nutrition status is improved, the related team members should have a meeting and decide on the ending of the management service.

5) Quality and cost evaluation : The effectiveness of nutrition care plan relies on how much the goals of nutrition, disease status, ADL, well-being improvement goals are being reached. And, for economic evaluations, complications, LOS, readmission rate, amount of medication etc are to be included.

Japan(Hokkaido) to southern Japan(Okinawa) had serum albumin levels of 3.5g/dl or lower (Fig. 3). In home-care settings in Fukui prefecture, 34.7% of the 98 female patients and 31.6% of the 75 male patients had serum albumin level of 3.5g/dl or lower. The same level of serum albumin was observed in 6.7% of the 135 female out-patients and 10.4% of the 125 male out-patients in 13 hospitals in Fukui prefecture, and in 0.2% of the 445 female health-check clients and in 0.7% of the 610 male health-check clients in Kumamoto prefecture.

The same level of serum albumin could be seen in 56% of the male patients 85 years and over and in ≥60% of the male and female bedfast patients(0 point of Bearthel Index level) was affected by age in males and affected by activity daily living(ADL) in males and females (Fig. 4).

These patients screened with albumin levels of ≤3.5g/dl were significantly more likely to die in a year(age-adjusted relative risk[R.R.] 3.2, 95% confidence interval[CI], 1.8-5.9 for fe-

male patients, and R.R., 2.6, 95% CI, 1.3 – 5.3 for male patients). On the other hand, these patients with ≤3.5g/dl albumin level were significantly more likely to decrease their activity in daily living(ADL), such as needing eating assistance(R.R., 3.4, 95% CI, 1.8 – 6.4), dressing and undressing(R.R., 2.6, 95% CI, 1.6 – 4.2), controlling bladder(R.R., 2.6, 95% CI, 1.1 – 5.4) during a year-long follow-up period.

In addition, 46% of the patients(the 88 male patients and the 254 female patients) were observed to have weight loss of ≥5%, 20% of the patients had weight loss of ≥10%, and 9.3% of the patients had weight loss of ≥15% in geri-
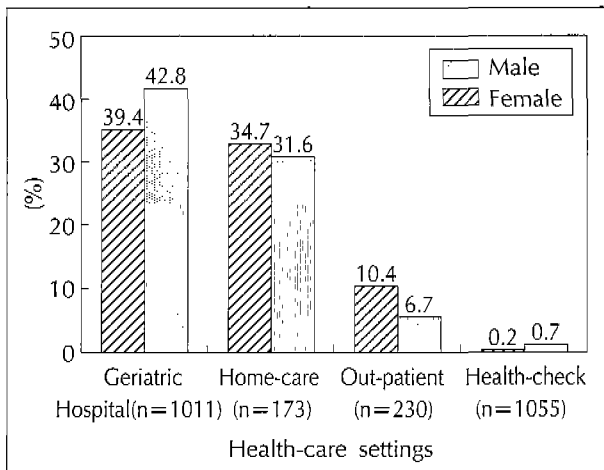

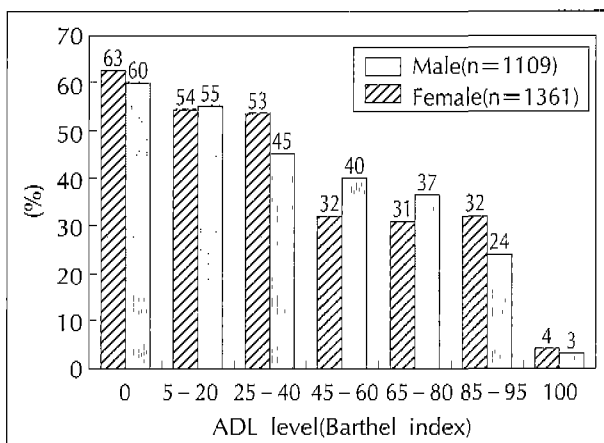Fig. 3. PEM status(serum albumin levels : ≤3.5g/dl) among the elderly in various health-care settings.

Fig. 4. PEM screened with albumin levels of ≤3.5g/ dl and Activity Daily Living(ADL) among the elderly people.

atric hospitals during the past year(Fig. 5). Patients with a weight loss ≥5% during the past year were signigicantly more likely to develop pressure ulcers(R.R., 3.9, 95% CI, 1.3 – 11.9 for female patients, and R.R., 8.0, 95% CI, 1.4 – 45. 4 for male patients), and decrease in ADL such as dressing and undressing(R.R., 3.2, 95% CI, 19 – 5.5), moving in general(R.R., 2.8, 95% CI, 1.7 – 4.5), feeding(R.R., 2.8, 95% CI, 1.6 – 4.7), controlling the bladder(R.R., 2.2, 95% CI, 1.3 – 3.8) and controlling the bowel(R.R., 2.1, 95% CI, 1.3 – 3.5).

We found therefore that, the nutritional screening for PEM is necessary in geriatric hospitals and home-care settings in Japan.

The Assessment Methods for the Elderly Patients with PEM Risk

1. Anthropometrics

It is often difficult to obtain an accurate stature measurement from an elderly person who is bedfast or chair-bound or who has spinal curvature. We could accurately measure stature in only 37.6% of the 1,048 geriatric hospital patients.

We identified that it was difficult to obtain the accurate BMI as an indicator for nutritional assessment among the elderly. It was believed that monitoring the changes of the anth-
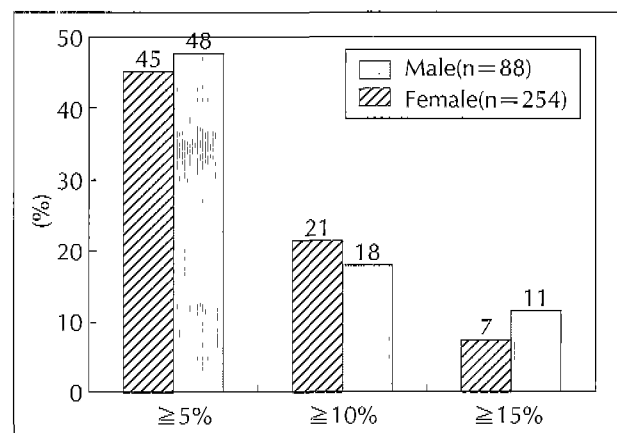

Fig. 5. Percentage of weight loss/year in the elderly patients.

ropometric measurement indexes, which could be measured accurately was more useful for nutritional assessment. Midarm and calf circumference loss in a year was significantly correlated to weight loss(Fig. 6).

Each anthropometric index could be evaluated by comparing the distribution of sex- and ADL-specific reference data collected with measurements of 2,550 elderly patients in various health-care settings. We made up percentile tables for body weight, tricep skinfold, subscapular skinfold, mid-upper arm circumference, and mid-upper arm muscle area according to sex and ADL level(Table 3).

2. The measurement of resting energy expenditure(REE)

A convenient and inexpensive method to measure REE was necessary to promote nutrition care for the elderly. Hosoya's portable indirect calorimeter(HPIC, METAVINE, VINE Co. Ltd.) developed by Dr. Hosoya N., was examined for its reproducibility and validity by comparing it with the indirect calorimeter(IC, DELTA-TRAC, DATEX Co. Ltd.)(Fig. 7).

HPIC evaluated the REE by measuring the respiration volume and respiratory oxygen consumption at bedside. For measurements, it requires no large-scale setting such as a canopy but work by just putting on a face mask and allowing the subjects to breathe normally for 3 minutes.

We also measured the REE of hospitalized elderly and the elderly who received health-check services and investigated physiological factors that affected the REE. The results of the studies showed that the use of HPIC was adequate to determine REE(C.V=12.8%), and measured values were significantly correlated to the values measured with $IC(r=0.8, p<0.001)$. We found the distribution range of the REE level of the subjects varied widely(440 – 2300kcal/day)(Fig. 8).

In addition, the REE among hospitalized elderly was not affected by gender, age, stature, nor weight, but differed among individuals and was influenced by diseases and disorders.

3. Protein and energy intake assessment method

We developed and evaluated the Convenient Protein Energy Intake Assessment Method(Fig. 9). The method was created to assess the intake rate of protein and energy of the elderly from their intake rate of staple food and main
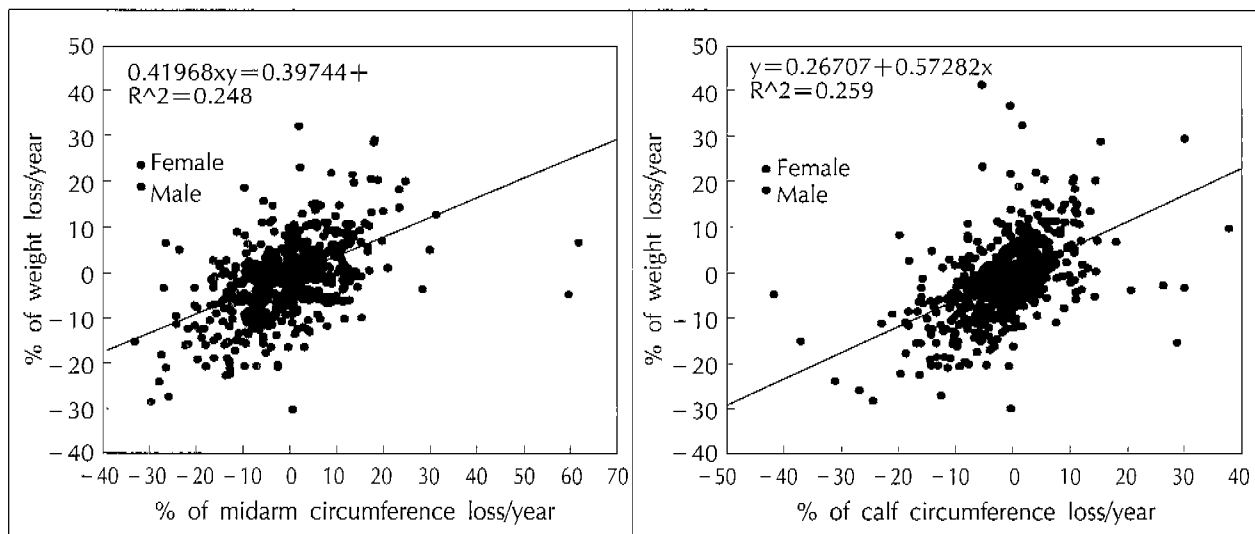

Fig. 6. Correlation of % of midarm or calf circumference loss/year and % of body weight loss/year.

Table 3A. Percentiles for anthropometiric indices by sex and ADL level(female)

ADL	No	Mean±SD	Percentile 5%	10%	25%	50%	75%	90%	95%
Body weight(kg)									
0	46	35±6.7	25	27	30	35	41	43	47
5–20	119	40±7.5	29	32	36	40	45	50	53
25–40	86	42±7.8	30	32	36	42	48	53	54
45–60	122	42±8.6	31	32	36	41	47	52	57
65–80	141	44±8.8	33	35	38	43	50	55	60
85–95	174	44±8.0	33	35	38	44	49	55	59
100	666	50±8.5	37	39	45	50	55	61	65
Calf circum ference(cm)									
0	52	23±2.8	18	19	20	23	25	27	27
5–20	116	26±3.5	20	21	23	25	28	30	32
25–40	84	27±3.5	21	22	24	27	29	31	33
45–60	123	28±3.7	23	23	25	28	30	32	33
65–80	138	29±3.3	24	25	27	29	31	34	35
85–95	172	29±3.1	24	25	27	29	31	33	34
100	662	32±3.6	27	28	30	32	34	36	37
Midupper arm circum ference(AMA)(cm)									
0	52	20±3.0	15	16	18	20	23	23	25
5–20	120	22±3.6	16	17	20	22	24	27	28
25–40	79	23±3.4	17	18	20	23	25	27	27
45–60	122	23±3.5	18	19	20	23	25	28	29
65–80	136	24±3.7	18	19	21	24	26	28	30
85–95	167	23±3.6	18	19	21	23	26	28	30
100	662	26±3.0	21	22	24	26	28	29	30
Tricep skinfold thickness(TSF)(mm)									
0	52	11±5.7	2	5	8	10	13	16	22
5–20	108	11±5.9	4	4	6	10	14	19	22
25–40	77	12±6.5	4	5	7	11	14	20	23
45–60	119	12±5.4	4	6	8	12	14	20	22
65–80	135	13±7.0	4	5	8	14	18	21	26
85–95	170	13±5.5	5	6	9	12	18	20	22
100	662	19±7.1	8	10	14	18	23	28	31
Subscapuler skinfold thickness(SSF)(mm)									
0	50	9±4.0	2	5	6	8	11	13	15
5–20	116	11±5.5	4	5	7	10	13	18	22
25–40	77	12±5.5	6	6	8	10	13	19	22
45–60	119	14±7.0	6	6	9	12	18	23	27
65–80	139	14±7.4	6	8	10	12	18	26	28
85–95	171	14±6.6	5	6	9	12	18	24	26
100	662	22±9.2	8	10	15	22	28	34	38

Table 3A. Continued(female)

ADL	No	Mean±SD	Percentile						
			5%	10%	25%	50%	75%	90%	95%
Midupper arm muscle circumference(cm)									
0	52	17±2.2	14	14	15	16	19	20	21
5–20	106	19±2.6	15	16	17	19	21	22	24
25–40	75	19±2.8	13	15	17	19	21	22	23
45–60	118	19±2.6	15	17	18	19	21	23	24
65–80	135	19±2.6	15	17	18	19	21	23	24
85–95	164	19±2.8	15	16	18	19	21	23	23
100	660	20±2.4	16	17	18	20	21	23	24
Midupper arm muscle area(cm^2)									
0	52	23±6.2	15	16	19	22	28	31	36
5–20	106	29±8.0	17	19	22	28	35	39	45
25–40	75	29±8.0	14	18	24	28	35	39	42
45–60	118	31±8.3	18	22	25	30	35	43	46
65–80	135	31±7.9	18	22	25	30	36	41	45
85–95	164	30±9.1	18	21	25	29	34	41	43
100	660	32±7.9	20	23	27	32	37	42	46

Table 3B. Percentiles for anthropometiric indices by sex and ADL level(male)

ADL	No	Mean±SD	Percentile						
			5%	10%	25%	50%	75%	90%	95%
Body weight(kg)									
0	20	48±8.4	36	38	43	49	56	59	60
5–20	74	46±8.0	34	37	42	45	52	57	60
25–40	38	47±8.2	34	36	41	46	53	57	60
45–60	71	50±8.6	38	39	43	51	55	61	66
65–80	77	50±8.7	36	39	45	50	55	60	62
85–95	61	53±8.5	40	41	48	53	59	63	64
100	760	59±8.8	45	48	53	59	65	70	73
Calf circum ference(cm)									
0	23	25±2.8	22	22	23	25	28	28	30
5–20	84	26±3.6	21	22	24	26	29	31	32
25–40	38	28±3.6	22	23	25	28	31	32	32
45–60	71	29±3.0	25	26	27	29	31	32	33
65–80	75	29±3.3	24	25	27	29	32	33	35
85–95	57	31±3.5	26	27	30	31	33	36	37
100	760	34±3.4	29	30	32	34	36	37	38
Midupper arm circum ference(AMA)(cm)									
0	21	23±3.0	20	20	21	21	25	27	28
5–20	76	23±3.1	18	19	20	23	24	26	28
25–40	37	23±3.2	18	18	21	23	24	27	27
45–60	65	24±3.3	20	20	22	25	27	28	29
65–80	63	24±3.2	19	20	21	24	26	28	29
85–95	57	25±2.8	22	22	23	25	27	29	31
100	755	27±2.8	23	24	26	27	29	31	31

Table 3B. Continued(male)

ADL	No	Mean±SD	5%	10%	25%	50%	75%	90%	95%
Tricep skinfold thickness(TSF)(mm)									
0	23	9±3.9	4	4	6	9	12	14	16
5-20	78	9±4.6	4	5	6	8	12	15	17
25-40	37	10±5.8	3	4	6	8	12	18	20
45-60	70	10±5.2	4	5	6	9	12	16	19
65-80	73	10±5.4	4	5	8	9	12	17	20
85-95	56	12±6.0	5	6	8	11	15	21	23
100	760	11±4.6	5	6	8	10	12	16	19
Subscapuler skinfold thickness(SSF)(mm)									
0	19	12±4.7	7	8	9	11	14	16	20
5-20	81	10±4.8	4	6	7	10	13	16	20
25-40	38	10±5.1	4	4	6	8	11	17	18
45-60	70	12±5.2	6	6	8	12	14	18	20
65-80	73	12±4.6	5	6	10	11	15	19	20
85-95	58	14±5.1	6	8	10	13	18	20	20
100	759	18±7.3	8	9	13	18	22	28	30
Midupper arm muscle circumference(cm)									
0	20	20±2.6	17	17	18	20	21	24	27
5-20	71	20±2.9	15	16	18	20	22	24	24
25-40	35	20±2.6	15	15	18	20	21	23	24
45-60	64	21±2.7	17	17	19	22	23	25	25
65-80	62	21±2.5	17	17	19	21	23	24	26
85-95	54	22±2.6	18	19	20	21	23	25	27
100	755	24±2.7	19	21	22	24	26	27	28
Midupper arm muscle area(cm²)									
0	20	33±8.9	22	23	25	32	36	46	56
5-20	71	33±9.4	18	21	26	32	38	44	48
25-40	35	31±7.8	17	19	25	31	37	43	45
45-60	64	37±9.1	23	24	29	37	43	49	52
65-80	62	35±8.5	23	24	28	35	41	47	53
85-95	54	37±9.2	25	27	32	36	41	51	56
100	755	46±10.5	30	34	40	46	52	58	62

dishes.

The convenient assessment method was examined for 7 consecutive days on 40 elderly persons. The intake rate and weighted food recorded were compared. The reproducibility, the variation of results among the people who performed the survey, and the day-to-day variation during the 7-day survey were examined. The survey was also performed to 722 female and 326 male patients in 15 geriatric hospitals.

The relationships among the percentage of protein intake in a day's diet, the food intake rate, and protein-energy malnutrition were also studied.

We obtained the results as follows : 1) If the examiner did a "pre-test" of the survey 3 times before actually performing the survey, the accuracy rate reached 90% or over. 2) The within- and between person variations were small(C.V., 0-6%), but the day-to-day variation was large

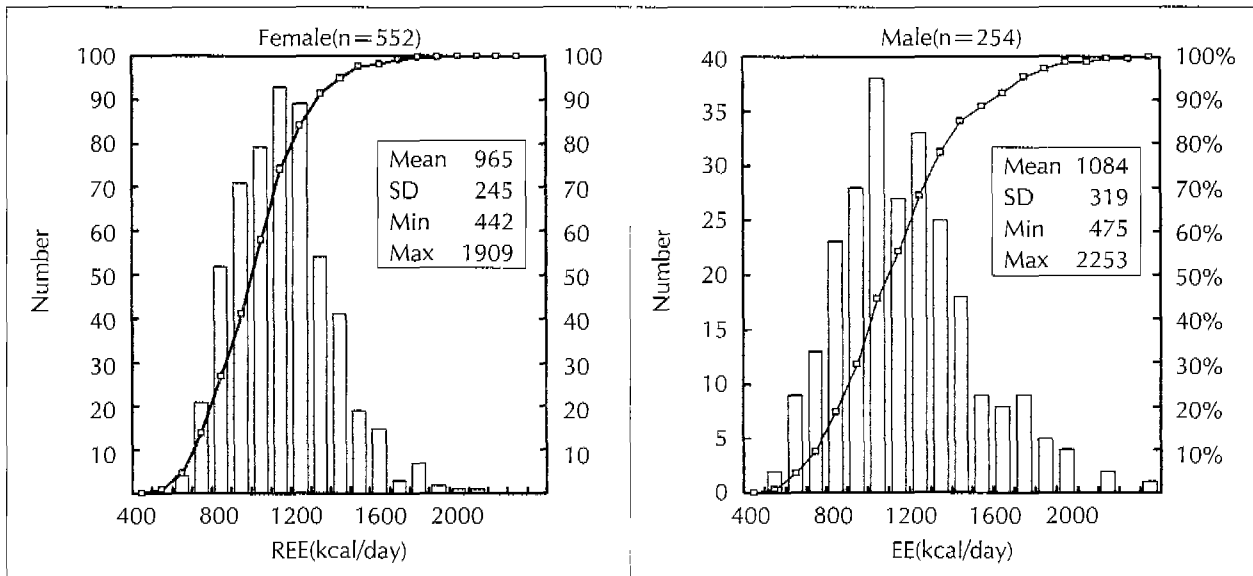| Indirect calorimeter(IC)	Hosoya's portable indirect calorimeter(HPIC)

Fig. 7. Indirect calorimeter.

Fig. 8. Distributions of the resting energy expediture level estimated by Hosoya's portable indirect calorimeter among the elderly patients.

(C.V., 15 – 37%). 3) The validity of the method on weighted food recorded proved consistent. 4) The percentage of protein intake in a day's diet was around 80% of the amount of energy and protein served per day. 5) If the intake rate lowered 20% or more, one may presume that the risk of PEM would be higher.

We concluded that the Convenient Protein Energy Intake Assessment Method was effective in obtaining correct protein and energy intake rates of the elderly persones living in institutions.

		Serving amount	Left-Over meal							Intake amount/day

Name   Person in charge   ID

Month/Day/Year

		Serving amount Staple food & main dish Energy : kcal Protein : g	0%	25%	33%	50%	67%	75%	100%	Intake amount/day Staple food & main dish Energy : kcal Protein . g
Breakfast	Staple food	kcal g								kcal g
	Main dish	kcal g								kcal g
Lunch	Staple food	kcal g								kcal g
	Main dish	kcal g								kcal g
Dinner	Staple food	kcal g								kcal g
	Main dish	kcal g								kcal g
Snacks		kcal g								kcal g
Evening Snacks		kcal g								kcal g

Note : = the amount of meal left over is 1/4 the entire meal

Intake rate	energy %
	protein %

Fig. 9. The convenient protein and energy intake assessment method.

The Effectiveness of Nutrition Care Plan

We examined the effectiveness of nutrition care plan to improve PEM status among elderly patients. Sixty elderly patients with albumin levels of $\leq 3.5g/dl$ were enrolled within 48hours of their admission in 7 geriatric hospitals. Twenty-four elderly patients were randomly chosen to receive supplements added to daily meals to provide $1.4 - 1.5g/kg$ weight/day protein and 1.5 times the REE in kcal of energy measured by the Hosoya's portable indirect calorimeter(the nutrition care group). Twenty-six elderly patients were randomly chosen to receive usual daily meals, based on the Recommended Dietary Allowance(the control group).

It was observed that after four weeks of intervention, the serum albumin level significantly increased in the nutrition care group as compared with the control group(Fig. 10). 8
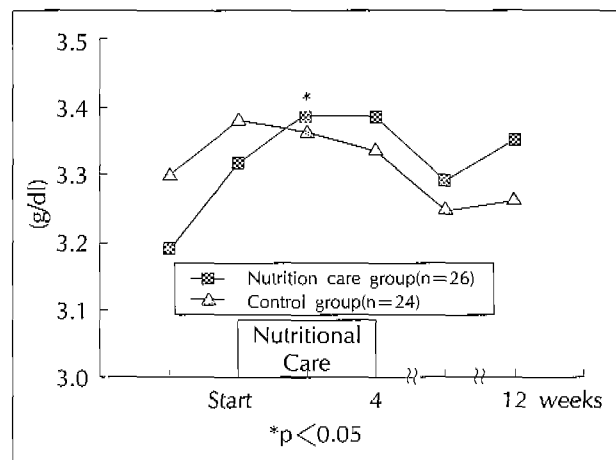

Fig. 10. Chang of serum albumin level in the nutrition care group.

weeks after intervention, it was observed that the serum albumin level in the nutrition care group was more likely to decrease as compared to the serum albumin level after 4 weeks of intervention.

On the other hand, a nutrition care plan is for an individual, through a care agreement, from all care providers involved and putting the

care plan into words. The report should include when, where, who, what and how for each care activity. This should include nutritional supplements(amount and method of energy and protein supplements), nutritional education(knowledge, attitude, behavior change plan), professional care plan from a wide avariety of professionals(physicians, dieticians, nurses, social workers, rehabilitation workers). All these should be put

into a care plan in a conference.

The Developed Nutrition Care and Management(NCM) Set

In the last step, based on the past three years of scientific evidence, we developed a Nutrition Care and Management(NCM) set (nanual, flow chart, check list)(Fig. 11). We
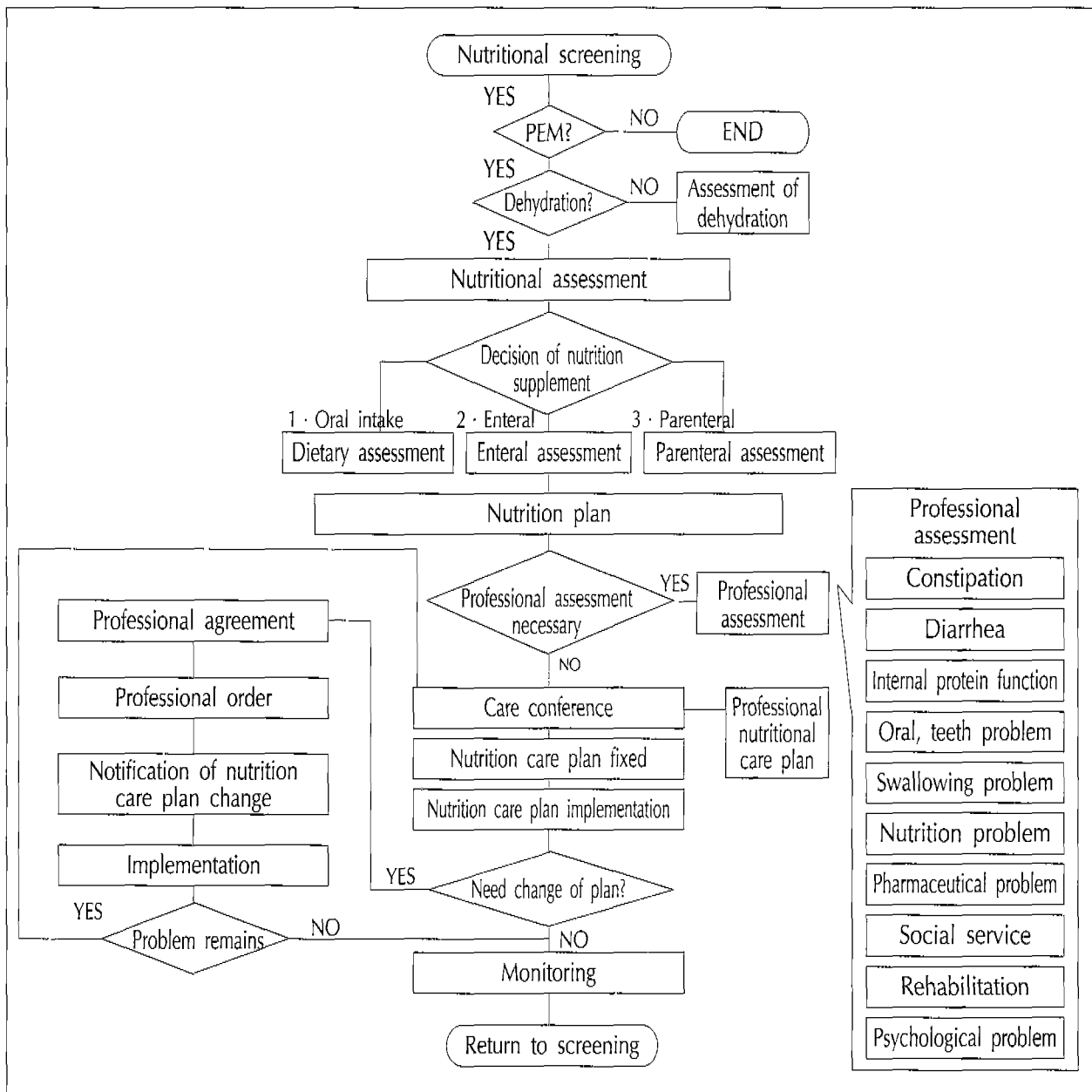

Fig. 11. The flowchart NCM sets for the elderly.

examined the feasibility of the NCM set among the elderly patients screened with albumin levels of ≤3.5g/dl on admission in four elderly care settings such as long-term, subacute, acute et al.

The NCM team was under the leadership of the Hospital Director instead of the usual separate management. We found that the check list items differed in their priorities according to each institute. We addressed the problems during the process and evaluated practice possibilities. Variance caused in the set developed was caused by variations in individual and family decisions, deteriorating health conditions, and doctor's decisions. On health outcomes, we confirmed the improvement of PEM, and ADL(Table 4).

Therefore, the NCM System developed by our project team could provide adequate nutritional care and create effective resource management for the elderly in Japan.

The Community Participation of NCM

The prevention and improvement of PEM do not rely solely on the care provision of the professionals. The elderly must also participate by self-examining and self-management of PEM. In addition, the families and the community must also support their better nutritional life style.

In the United States, a Nutrition Screening

Table 4. Health outcomes among elderly patients induced by NCM sets

% of elderly patients with change for the better (total patients n=25)	
• Serum albumin	64
• Body weight	60
• ADL	40
• Depletion-scale	44
• No. of medicine	36

Initiative(NSI) was introduced in 1991(Nutritional Screening Initiative 1992 ; Rush 1993). The initiative developed a simple check list for screening of early PEM risk individuals. The method was popular nationwide and later, nutrition assessment and a team care system were introduced. At the moment, we are also planning to develop a similar assessment method that includes 20 items(Sugiyama et al. 2000)(Table 5). The method will be used at all health centers and private sectors. It will serve as a project for the Ministry of Health to induce better elder care and nutrition risk prevention.

In order to improve PEM status by providing nutrition supplement, food service, home delivery service, home enteral and parenteral nutrition management, it is necessary to have private sector's participation(Fig. 12). NCM should be a big market and will need ful com-

Table 5. Self-assessment list for the elderly

1. I have lost more than 5% of weight within last 6 months unintentionally
2. I feel that I have less muscle and fat compared to 6 months ago
3. I have problems with a tooth, mouth and swallowing
4. I have persistent diarrhea or laxative drug use
5. I have persistent constipation
6. I have been hospitalized or had an operation, lately
7. I have taken five or more different prescribed drugs or over the counter drugs a day
8. I eat fewer than two meals per day
9. I eat less staple food(such as rice or noodles) than before
10. I eat less main dishes(fish or meat) than before
11. I do not ingest much milk or milk products
12. I eat alone every day
13. I frequently do not have enough money to buy the food I need
14. I am less active than before
15. I have a physical restriction for eating
16. I have a physical restriction for grocery shopping
17. I have a physical restriciton for cooking
18. I have less of an appetite than before
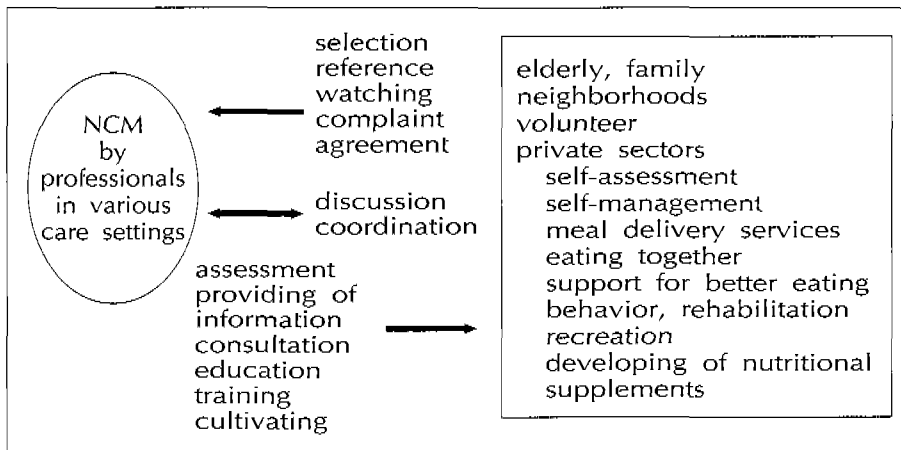19. I do not enjoy eating

selection
reference
watching
complaint
agreement

NCM
by
professionals
in various
care settings

discussion
coordination

assessment
providing of
information
consultation
education
training
cultivating

elderly, family
neighborhoods
volunteer
private sectors
self-assessment
self-management
meal delivery services
eating together
support for better eating
behavior, rehabilitation
recreation
developing of nutritional
supplements

Fig. 12. The community participation of NCM.

munity support.

Conclusions

To summarize, in order to practice Nutrition Care and Management for PEM among the elderly patients, a standard nutritional assessment and nutrition care system is needed in most geriatric hospitals and home-care settings. The standard protocols include the following : 1) Routinely measure serum albumin and percent of weight loss(or percent of midarm or calf circumference loss). 2) With high PEM risk in elderly patients, nutritional assessment as follows are needed : standardized anthropometric measurements, measurement of REE by a portable Indirect calorimeter, and assessment of protein and energy intake using the Convenience Protein Energy Intake Assessment Method. 3) To improve PEM status among the elderly patients, include a plan to provide $1.4 - 1.5 g/kg$ body weight/day protein and $REE \times 1.5 kcal$ energy. And, 4) using the standard NCM set developed for the purpose of nutritional assessment and nutrition care to improve the PEM status of the elderly in long-term, rehabilitation and acute-care.

In Japan, a new nursing insurance system is to be enforced in April 2000, where premiums will be paid according to the level of care

necessary. It is expected that the NCM set will provide adequate nutritional care management, improve the elderly care environment and create effective resource management.

References

Bistrian BJ, Blackburn GL, Hallowell E, et al.(1974) : Protein status of general surgical patients. *JAMA* 230 : 858-860

Bistrian BJ, Blackburn GL, Vitale J(1976) : Prevalence of malnutrition in general medical patients. *JAMA* 235 : 1567-1570

Gallagher-allred C, Coble Voss A, Finn SC, McCamish MA(1996) : Malnutrition and clinical outcomes : The case for medical nutrition therapy. *J Am Diet Assoc* 96 : 361-366

Koyama H, Sugiyama M(2000) : The quality of nutrition care and economic management in hospital. *Syakai-hokenjunpou* 2056 : 12-17(in Japanese)

Seiler WO, Stahelin HB, Edt.(1999) : Malnutrition in the elderly, Dr. Dietrich Steinkopf Verlag GmbH & Co. KG, Darmastadt

Sheils JF, Rubin R, Stapleton DC(1999) : The estimated costs savings of medical nutrition therapy : The medicare population. *J Am diet Assoc* 99 : 428-435

Sugiyama M, Koyama H, Eds(Supervisor : Matsuda A, Hosoya N)(1996) : The New Nutritional Approach : Nutrition Care and Management for the Elderly,

Daiichi-shuppan, Tokyo, 1998(in Japanese). 6) Tuciker HN, Miguel SG(1996) : Cost Contaminment through intervention. *Nutrition Reviews* 54 : 111-121

Sugiyama M, Koyama H, Eds.(Suppervisor : Matsuda A, Hosoya N)(1998) : The New Nutritional Approach : Nutritiona Care and Management for the Elderly, Daiichi-shuppan, Tokyo(in Japanese)

Sugiyama M, Nishimura A, Takamoto K(2000) : Self-Assessment for protein-energy malnutrition in the elderly, Health Assessment, Koshu-eisei Kyokai Eds.

Kousei Kagaku(in Japanese inpress)

Matsuda A(1996 - 1999) : The project of NCM for the Elderly, by the grant of the Ministry Health and Welfare, The Nutritional Care and Management (NCM) for the Elderly in Japan(in Japanese)

Nutrition Screening Initiative(1992) : Nutrition Intervention Manual for Professionals Caring for Older American, Washington DC

Rush D(1993) : Evaluating the Nutrition Screening Initiative. *Am J of Public Ealth* 83(7) : 994-995