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CLINICAL NUTRITION RESEARCH

Development of Job Standards for Clinical Nutrition Therapy for Dyslipidemia Patients

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Dyslipidemia has significantly contributed to the increase of death and morbidity rates related to cardiovascular diseases. Clinical nutrition service provided by dietitians has been reported to have a positive effect on relief of medical symptoms or reducing the further medical costs. However, there is a lack of researches to identify key competencies and job standard for clinical dietitians to care patients with dyslipidemia. Therefore, the purpose of this study was to analyze the job components of clinical dietitian and develop the standard for professional practice to provide effective nutrition management for dyslipidemia patients. The current status of clinical nutrition therapy for dyslipidemia patients in hospitals with 300 or more beds was studied. After duty tasks and task elements of nutrition care process for dyslipidemia clinical dietitians were developed by developing a curriculum (DACUM) analysis method. The developed job standards were pretested in order to evaluate job performance, difficulty, and job standards. As a result, the job standard included four jobs, 18 tasks, and 53 task elements, and specific job description includes 73 basic services and 26 recommended services. When clinical dietitians managing dyslipidemia patients performed their practice according to this job standard for 30 patients the job performance rate was 68.3%. Therefore, the job standards of clinical dietitians for clinical nutrition service for dyslipidemia patients proposed in this study can be effectively used by hospitals.

Key Words: Dyslipidemia, DACUM, Clinical dietitian, Job standards, Clinical nutrition service

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Introduction

Prevalence of chronic illnesses is increasing due to rapid economic development, undesirable lifestyle and diet, and the increase of elderly population [1,2]. Particularly, a cardiovascular disease is one of the top three causes of death around the world and induces significant economic burden [3,4]. In South Korea, prevalence of dyslipidemia is also increasing and contributes to growing of death and morbidity rate in patients with cardiovascular diseases [5,6]. Various factors such as age, physical activity, obesity, heredity and stresses are affecting

the development of dyslipidemia [7] and, especially, a diet is the most influencing factor to dyslipidemia [8]. Hence a certain but official format of dietary guidelines is necessary and become important component in effective management and prevention of dyslipidemia [9]. Korean Society of Lipidology and Atherosclerosis proposed a modified and supplemented dyslipidemia treatment guideline in 2009. The guideline recommends maintaining normal weight; limiting cholesterol intake to 200 mg per day as suggested by national cholesterol education program adult treatment panel III (NCEP-ATP III); limiting saturated fatty acids to 7% of the total energy intake, as the intake of animal lipids is increasing; limiting trans fatty acids less than 1% of the total energy intake recommend by world health organization (WHO); polyunsaturated fatty acid to 10% of the total energy intake, soluble dietary fiber to 10–25 g/d; carbohydrate to 60% of the total energy intake; and alcohol less than two glasses per day [10]. Furthermore, relevant guidelines were announced in USA and European countries and the correlation between dyslipidemia and diet were emphasized in their announcement [11,12].

In South Korea, for systematic and intensified dietary management in clinics and hospitals, the Korean goverment legislated certification system for government certified clinical dietitians in 2010 and began this certification system in 2012 to foster government-certified clinical dietitians who will perform nutrition assessment, nutrition consultation, and nutrition monitoring and evaluation [13]. Professional clinical nutrition service has been reported to have positive effects on reducing length of stay (LOS) and medical costs of patients [14-16], and Korean medical staff of the clinical nutrition services for disease management are always in high demands in Korea [17]. In the U.S., joint commission on accreditation of health organization (JCAHO) and academy of nutrition & dietetics (AND, former American dietetic association) participated in developing nutrition care standard for clinical dietitians in planning of diet therapy [18] and AND proposed standards of practice (SOP) and standard of professional performance (SOPP) for clinical dietitians [19,20]. Although Korean hospitals and clinics introduced the concept of nutrition care process (NCP) for standardizing the process of nutrition management by clinical dietitians, actual NCP application cases in the field are very limited so far. Also, even though several researched investigated job characteristics and level of job-satisfactions of dietitians in healthcare centers, schools and hospitals there are no relevant job standard to evaluate job performance or properties of dietitians and the proportion of clinical nutri-

tion tasks in their daily duties is very low [21-25]. Recently, developing a curriculum (DACUM) for defining the job of clinical dietitians at hospitals and standardizing the job based on job description was attempted and devleoped by nutrition experts. However, only a few researches has been conducted regarding job analysis and standardization of tasks for clinical dietitians according to a type of diseases. Therefore, in this study, the job of clinical dietitians who are involved nutrition management of dyslipidemia patients will be analyzed and job standards developed, in order to effectively manage and treat patients with dyslipidemia.

Materials and Methods

Current status and practice of clinical nutrition services

This study was approved by institutional review board (IRB, approval no.: YUHS01-13-003) of Yeungnam university. A survey was conducted on general status of hospital, the number of hospital beds (permitted beds, adjustable beds), clinical dietitian workforce, practice and result of nutrition education and consultation programs, and other questions related to dyslipidemia management by post-mail and email with clinical dietitians at medium and large hospitals with 300 or more beds in Korea from March 2014 to April 2014. Among 239 hospitals, questionnaire was collected from 104 hospitals (39 tertiary hospitals, 59 general hospitals, 6 hospitals), and that was 43.5% answering rate.

Job analysis and job standards development

In order to develop job standards to standardize the job of clinical nutrition service for dyslipidemia, a DACUM committee was made up of 17 members including clinical dietitians. DACUM is a method to extract task and task elements of clinical dietitians who provide the service to dyslipidemia patients and through this process DACUM creates a relevant job list. The DACUM committee workshop, first, defined the job of clinical dietitians for dyslipidemia and created competency standards based on characteristics of dyslipidemia. The job standard was composed of job elements of basic nutrition care services that clinical dietitian performed and recommended nutrition services specific for dyslipidemia patients. Details of recommended services were added, and, after several meetings, a draft of job standards based on NCP and practice was drawn. Later, the job standards were modified and supplemented based on advice and review of relevant institutes and experts.

Field application evaluation

For field application evaluation, 10 medical institutions among those with most trainings on dyslipidemia were selected based on the size and region of institution. The survey included job performance, difficulty, and job standard form evaluation, and, for job performance, performance of each task element was studied at each medical institution based on medical records of three cases of clinical nutrition service. Also, task difficulty was recorded based on 'basic service' and 'recommended service' according to practical experience of the subjects, while the job standards form was evaluated by having the subjects write their opinion on changes that need to be made.

Statistical analysis

All statistical analyses were based on SPSS 21.0 (IBM Corp., NY, USA), and general information of the hospitals was expressed in frequency (percentage) and average $\pm$ standard deviation. Education fee and reason for not receiving education fee were examined using multiple responses. ANOVA was used to compare in dyslipidemia nutrition education costs between different types of education. For an inter-group analysis, a post-hoc analysis was performed with Scheffe test. Statistical significance was set at $p < 0.05$.

Results

Practice of clinical nutrition service for dyslipidemia

General status of the hospitals

Of the 104 hospitals that participated in this study, 39 (37.5%) were tertiary hospitals, 59 (56.7%) general hospitals, and 6 (5.8%) hospitals. The number of permitted beds was highest in tertiary hospitals, average 985, followed by general hospitals, 599, and hospitals, 393. Also, 69.2% of tertiary hospitals, 56.9% of general hospitals, and 16.7% of hospitals had a separate nutrition education rooms (Table 1).

Current status of clinical nutrition service for dyslipidemia

Table 2 shows the reasons why the subject hospitals receive or do not receive dyslipidemia-related education fees. Of the subject hospitals, 66.7% do not receive the dyslipidemia-related education fee and 48 hospitals of them responded that it was because of 'difficulty of making an education team.'

Table 1. General characteristics of the hospitals surveyed

Type	N (%)	Permitted number of beds, N*	Adjustable number of beds, N*	Separate educational room (%)
Tertiary hospital	39 (37.5)	985 $\pm$ 475	980 $\pm$ 485	69.2
General hospital	59 (56.7)	599 $\pm$ 195	582 $\pm$ 188	56.9
Hospital	6 (5.8)	393 $\pm$ 130	352 $\pm$ 89	16.7
Total	104 (100.0)	736 $\pm$ 387	719 $\pm$ 391	59.2

*Mean $\pm$ SD.

Table 2. Items related to education fee for dyslipidemia care

Classification		Tertiary hospital	General hospital	Hospital	Total
Education fee	Paid	16 (41.0)	16 (27.6)	2 (40.0)	34 (33.3)
	Unpaid	23 (59.0)	42 (72.4)	3 (60.0)	68 (66.7)
	Total	39 (100)	58 (100)	5 (100)	102 (100)
Reason for not receiving education fee* (n = 68)	Difficulty of making educational team	19 (82.6)	28 (66.7)	1 (33.3)	48 (70.6)
	Lack of full charge educator	15 (65.2)	26 (61.9)	1 (33.3)	42 (61.8)
	Difficulty to receive patient's agreement	5 (21.7)	19 (45.2)	1 (33.3)	25 (36.8)
	Others	3 (13.0)	6 (14.3)	1 (33.3)	10 (14.7)

*Multiple response. N (%).

Table 3 shows the current status of dyslipidemia nutrition education. To the multiple-response question related to the types of dyslipidemia nutrition education, 13.0% responded 'group education', 82.0% 'individual education', 1.0% 'practice', and 4.0% 'group + individual education', and the average education fees were 6,500 KRW for group education, 14,498 KRW for individual education, and 32,625 KRW for group + individual education.

Job standards for clinical nutrition treatment of dyslipidemia

Definition of clinical dietitians for dyslipidemia was made first by the DACUM workshop. And then, after several meetings, clinical dietitians for dyslipidemia were defined as a professional who performs clinical nutrition treatment including self-management education and training to treat dyslipidemia and prevent complications of dyslipidemia for individuals and groups.

Table 3. Nutrition education related to dyslipidemia care

Education type	N (%)[*]	Education fee (won/case)[†]	p value[‡]
Group	13 (13.0)	$6,500 \pm 15,921^b$	
Individual	82 (82.0)	$14,498 \pm 15,207^{ab}$	
Practice	1 (1.0)	–	0.029
Group+Individual	4 (4.0)	$32,625 \pm 11,785^a$	
Total	100 (100.0)	$14,783 \pm 15,613$	

[*]Multiple response; [†]Mean $\pm$ SD; [‡]Multiple-comparison by Scheffe test.
[a-b]Values with the same superscript letters within the column are significantly different at $p < 0.05$.

	Duties		Task				
A	Nutrition assessment	A1. Review basic information	A2. Review medical history and treatment plan	A3. Evaluation of anthropometric measurement data	A4. Review laboratory and medical test	A5. Review nutrition focused physical findings	A6. Collection and evaluation of food nutrition-related data
		A7. Decision of nutritional requirement	A8. Documentation of nutrition assessment				
B	Nutrition diagnosis	B1. Derivation of nutrition diagnosis	B2. Documentation of nutrition diagnosis				
C	Nutrition intervention	C1. Planning of nutrition intervention	C2. Management of nutritional prescription	C3. Implementation of nutrition intervention	C4. Documenting of nutrition intervention		
D	Nutrition monitoring evaluation	D1. Monitoring of nutritional status	D2. Monitoring of nutrition intervention process	D3. Evaluation of nutrition intervention	D4. Documentation of nutrition monitoring evaluation		

Figure 1. DACUM chart of job description of clinical dietitian for dyslipidemia care.

Table 4. Characteristics of the subjects for field application of job standards of clinical dietitian for dyslipidemia care

Variable	Classification	
Gender[*]	Female	17
	Male	13
Age, yrs[†]		54.2 ± 12.2
Patient type[*]	Inpatient	14
	Outpatient	16
Nutrition management[*]	Initial management	21
	Follow-up management	9
Duration of nutrition management, min/case[†]		43.8 ± 14.0

[*]N; [†]Mean ± SD.

The job of clinical dietitians for dyslipidemia patients was analyzed based on the DACUM method, and the job specification included duties, tasks, and task elements. It was composed of 18 tasks and 53 task elements, which were organized in a table (DACUM chart) by duties (Figure 1). Here, the main duties of clinical dietitians were based on core duties defined in previous research [26], and, were in accord with the NCP steps of international confederation of dietetic associations (ICDA), 'A. nutrition assessment', 'B. nutritional diagnosis', 'C. nutrition intervention', and 'D. nutrition monitoring and evaluation.' The duties included specific tasks: for 'A. nutrition assessment,' A1. review basic information, A2. review medical history and treatment plan, A3. evaluate anthropometric data, A4. review laboratory and medical test, A5. review nutrition focused physical findings, A6. collect and evaluate data related to food and nutrition, A7. decide nutritional needs, and A8.

document nutrition assessment; for 'B. nutritional diagnosis,' B1. derivate nutritional diagnosis, and B2. document nutritional diagnosis. 'C. nutrition intervention' C1. plan nutrition intervention, C2. management of nutritional prescription, C3. implement of nutrition intervention, C4. document nutrition intervention, and 'D. nutrition monitoring and evaluation,' D1. monitor nutritional status, D2. monitor the nutrition intervention process, D3. evaluate nutrition intervention, and D4. document nutrition monitoring and evaluation.

Based on these job descriptions, a specific job description was added to each task element and the tasks were classified as 'basic' and 'recommended.' 'Basic' means basic tasks that clinical dietitians must perform, whereas 'recommended' means tasks performed by experienced professional dietitians for dyslipidemia.

Table 5. Performance rate of standardized jobs in field application tests

Variable	N	Performance rate (%)
Work activity		
Basic	65	76.9
Recommended	35	52.5
Total	100	68.3
Duty		
Nutrition assessment	52	74.4
Nutrition diagnosis	9	86.0
Nutrition intervention	23	75.5
Nutrition monitoring	16	28.2
Total	100	68.3

Table 6. Performance rate of standardized jobs in field application tests according to patient type

Duty	patient type	Performance rate (%)
Nutrition assessment	Inpatients	67.1
	Outpatients	79.4
Nutrition diagnosis	Inpatients	69.7
	Outpatients	97.2
Nutrition intervention	Inpatients	76.7
	Outpatients	74.7
Nutrition monitoring	Inpatients	39.2
	Outpatients	20.7

Table 7. The coincidence rate of perception between the researchers and clinical dietitians on difficulty of standardized jobs in field application tests

Duty	work activity	Rate of coincidence (%)
Nutrition assessment	Basic	85.6
	Recommended	46.0
Nutrition diagnosis	Basic	62.5
	Recommended	66.7
Nutrition intervention	Basic	56.8
	Recommended	55.6
Nutrition monitoring	Basic	63.0
	Recommended	54.0

Field application evaluation

General information on the subjects and nutrition practice in medical institutions

Field application evaluation was performed by working clinical dietitians at 10 medium and large hospitals, and Table 4 shows general information on patients with dyslipidemia to whom the study was applied. Of the 30 patients, 17 were female and 13 male, and the average age was 54.2. Also, 14 were inpatients and 16 outpatients, and 21 received nutrition management only in the beginning while 9 received follow-up management as well. And, the average time for clinical dietitians to provide nutrition management for these patients was 43.8 minutes.

Job performance rate and difficulty

When the job standards were applied to the hospitals, of the 65 basic tasks, 76.9% was performed and, of the 35 recommended services, 52.5% was performed. Also, in terms of duties, 74.4% of the 52 nutrition assessment tasks, 86.0% of the 9 nutritional diagnosis tasks, 75.5% of the 23 nutrition intervention tasks, and 28.2% of the 16 nutrition monitoring and evaluation tasks were performed (Table 5). Table 6 presents the result of studying job performance by duty according to types of dyslipidemia patients. The performance rates of nutrition assessment, nutritional diagnosis, nutrition intervention, and nutrition monitoring and evaluation for inpatients were 67.1%, 69.7%, 76.7%, and 39.2%, respectively, and, for outpatients, 79.4%, 97.2%, 74.7%, and 20.7%.

Table 7 presents the rate of coincidence for task difficulty between the researchers and clinical dietitians. The rates of coincidence for basic tasks, nutrition assessment, nutritional diagnosis, nutrition intervention, and nutrition monitoring and evaluation, were 85.6%, 62.5%, 56.8%, and 63.0%, respectively, while those of recommended services were 46.0%, 66.7%, 55.6%, and 54.0%.

Table 8. The job description of clinical dietitian for dyslipidemia care

Duty	Task	Task element	Work activity	Basic	Recommended
A. Nutrition assessment	A1. Review basic information	A1-1. Verifies referrals	1. Verifies nutritional referrals (eg, data, reason, diagnosis, prescribed diet etc.).	√	
		A1-2. Verifies personal information	1. Verifies age, sex, and ethnicity.	√	
	A2. Review medical history and treatment plan	A2-1. Checks diagnosis and treatment plan	1. Checks type and complication of dyslipidemia.	√	
			2. Checks dyslipidemia treatment	√	
			3. Identifies dyslipidemia comorbidities treatment plan.		√
		A2-2. Checks history of prescribed medication	1. Assesses current prescription medications and changes of lipid-lowering medications	√	
			2. Evaluates prescribed medications affecting on blood lipid levels		√
		A2-3. Checks complications and related risk factors	1. Checks risk factors for dyslipidemia complications	√	
			2. Checks risk factors for dyslipidemia comorbidities complications		√
		A2-4. Checks referral treatment results	1. Checks referral treatment results related to nutrition care process by medical record.		√
		A2-5. Checks personal disease history data	1. Reviews personal socioeconomic factors(eg, job, education, economic status, family number).	√	
			2. Reviews history of tobacco, alcohol.	√	
			3. Reviews history of previous dyslipidemia nutrition education/consultation.	√	
			4. Checks any other cardiovascular disease history	√	
	A3. Evaluation of anthropometric measurement data	A3-1. Evaluates anthropometric measurement data	1. Evaluates height, weight and waist circumference.	√	
		A3-2. Collects historical data of body weight change	1. Assesses the usual body weight and weight change.	√	
			2. Evaluates reasons of weight change and weight status.	√	
		A3-3. Assesses body composition data	1. Evaluates body fat and muscle measurements.		√
			2. Evaluates visceral fat measurements.		√
	A4. Review laboratory and medical test data	A4-1. Examines blood urine test data	1. Evaluates blood lipid profile and glucose test results	√	
			2. Assesses other nutrition-related data (eg, albumin, electrolytes, anemia test, ketone body etc.), liver function data, and thyroid function data.		√
		A4-2. Examines physical function data	1. Evaluates physical activity performance, cardiopulmonary function, sensory sensitivity, or musculoskeletal function data.		√
	A5. Review nutrition focused physical findings	A5-1. Examines chewing and swallowing function	1. Assesses chewing functions (eg, dental condition, gum disease).	√	
			2. Assesses swallowing functions (eg, choking, esophageal disease, pain on swallowing).		√

Table 8. Continued

Duty	Task	Task element	Work activity	Basic	Recommended
A. Nutrition assessment	A5. Review nutrition focused physical findings	A5-2. Examines gastrointestinal symptom	1. Assesses gastrointestinal symptoms (eg, decreased appetite, dyspepsia, bloating, flatulence, abdominal pain, diarrhea, constipation, nausea, vomiting, hunger etc.).	√	
		A5-3. Examines vital signs	1. Assesses blood pressure.	√	
		A5-4. Examination of physical symptom	1. Assesses malnutrition-related physical symptom.		√
	A6. Collection and evaluation of food·nutritionrelated data	A6-1. Evaluates dietary history	1. Evaluates current dietary habits (eg, number and time of meals and snacks, meal rate, meal composition, eating out patterns, drinking (frequency / volume / side dishes etc.).	√	
			2. Evaluates favorite/avoid foods, food allergy and symptoms.	√	
			3. Evaluates dietary supplements, and complementary and alternative medicine practices.	√	
			4. Evaluates adequacy of dietary habits according to dietary guidelines for dyslipidemia care (eg. Korean dyslipidemia guidelines, Korean dietary guidelines etc.).	√	
		A6-2. Evaluates dietary intakes	1. Evaluates type and amount of daily food intake by using 24 hour recall, dietary record.	√	
			2. Evaluates frequencies of total fat, saturated fat, trans fat, and cholesterol-containing food intake	√	
			3. Evaluates carbohydrate, dietary fiber, and alcohol intakes	√	
			4. Evaluates adequacy of energy and nutrient intakes according to dietary guidelines for dyslipidemia care (eg. Korean dyslipidemia guidelines, Korean dietary guidelines etc.).	√	
		A6-3. Examines physical activity level	1. Evaluates current level of physical activity.	√	
			2. Assesses kind, strength, time and frequency of current exercise.	√	
			3. Considers effect of ability to perform activities of daily living (ADLs) and Instrumental ADL on dietary intakes.		√
		A6-4. Examines dietary environment	1. Assesses social, economic, and environmental factors that affect meal planning, food purchasing, cooking, and food availability.	√	
			2. Assesses availability of social/medical support and degree of social interaction.		√
			3. Assesses psychological factors affecting nutritional problems.		√
		A6-5. Evaluation of nutritional knowledge and attitudes	1. Identifies knowledge and skills to dietary intakes	√	
			2. Assesses behavioral mediators related to dietary intake (eg, attitudes, self-efficacy, intentions, readiness and willingness to change).		√
			3. Identifies degree of performance of self-control and monitoring to dietary intake		√

Table 8. Continued

Duty	Task	Task element	Work activity	Basic	Recom-mended
A. Nutrition assessment	A7. Decision of nutritional requirement	A7-1. Decides calorie needs	1. Decides calorie needs according to dietary guidelines for dyslipidemia care.	√	
		A7-2. Decides individual nutrient needs	1. Decides nutrient needs (fat, carbohydrate, sodium) according to dietary guidelines for dyslipidemia care.	√	
			2. Determine the needs for food supplements and health food. based on scientific evidence		√
	A8. Documentation of nutrition assessment	A8-1. Identifies nutrition assessment standard terminology	1. Identifies nutrition assessment standard terminology.	√	
		A8-2. Documents nutrition assessment	1. Documents nutrition assessment (eg, collected data, assessment data).	√	
B. Nutrition diagnosis	B1. Derivation of nutrition diagnosis	B1-1. Identifies the problem	1. Identifies the problem based on the nutrition assessment data.	√	
			2. Differentiates between nutrition-related, dyslipidemia-related, and treatment-related side effects.	√	
			3. Prioritizes nutrition problems in order of importance/urgency/efficacy/resolving possibility.	√	
		B1-2. Determines etiology	1. Evaluates multiple factors(eg, pathophysiological, psychosocial, situational, cultural, and environmental causes etc.) that impact nutrition problem(s).	√	
		B1-3. Clusters signs and symptoms	1. Clusters signs and symptoms to define nutrition problems.	√	
	B2. Documentation of nutrition diagnosis	B2-1. Identifies nutrition diagnosis standard terminology	1. Identifies nutrition diagnosis standard terminology.	√	
		B2-2. Documents nutrition diagnosis	1. Documents the ranked nutrition problems.	√	
			2. Documents etiology of the ranked nutrition problems.	√	
			3. Documents sings and symptoms of the ranked nutrition problems.	√	
C. Nutrition intervention	C1. Planning of nutrition intervention	C1-1. Sets nutrition intervention goals	1. Prioritizes nutrition intervention goal(long term/short term) to solve problems based on nutrition diagnosis.	√	
			2. Prioritizes nutrition intervention goal based on dyslipidemia complications and comorbid diseases.	√	
			3. Discusses intervention goal with client, caregivers, and other health care providers.		√
		C1-2. Plans the details for nutrition intervention	1. Determines specific nutrition intervention (eg, food, nutrition education & counseling, multidisciplinary team approach etc.) that can effectively achieve goal.	√	
			2. Prioritizes dyslipidemia related nutrition problems in order of importance/urgency/efficacy/resolving possibility.	√	
			3. Establishes detailed plan for nutrition education contents and methods	√	

Table 8. Continued

Duty	Task	Task element	Work activity	Basic	Recom-mended
C. Nutrition intervention	C2. Management of nutritional prescription	C2-1. Calculates diet prescription and menu	1. Calculates nutritional requirements depending on the evidence based guidelines and protocols	√	
		C2-2. Management diet prescription and menu	1. Evaluates pertinence of diet prescription and menu.	√	
			2. Individualizes diet prescription and menu according to requirements, preferences, and compliance of clients.	√	
			3. Evaluates a negative or risk factors of diet prescription		√
			4. Evaluates nutrients and drug interaction (eg,, anticoagulants) and digestion or absorption complication by drug		√
	C3. Implementation of nutrition intervention	C3-1. Supplies foods and nutrients	1. Provides diet (foods/nutrients) by nutritional prescription	√	
			2. Makes and manages the menu based on the written instructions of diet manual		√
		C3-2. Preforms nutrition education	1. Decides nutrition education contents according to age, medical condition, knowledge, beliefs, attitudes, and considering other personal characteristics of subjects for dyslipidemia treatment	√	
			2. Performs nutrition education (individual, group education)	√	
			3. Evaluates client's comprehension and compliance to nutrition education by questionnaires.		√
		C3-3. Conducts nutrition counseling	1. Decides individualized tools and strategies to change dietary habits of client	√	
			2. Performs nutrition counseling by using decided tools and strategies	√	
			3. Evaluates client's compliance and practical mind to nutrition counseling.	√	
		C3-4. Plans follow-up care for nutrition counseling	1. Plans for follow-up care (eg, frequency, contents, and implementation).	√	
			2. Notify the follow-up care with patients, caregivers, and the relevant staff.		√
	C4. Documentation of nutrition intervention	C4-1. Identifies nutrition intervention standard terminology	1. Identifies nutrition intervention standard terminology.	√	
		C4-2. Documents nutrition intervention	1. Documents nutrition problems and intervention	√	
			2. Documents specific intervention goals and expected outcomes for follow-up care.	√	
			3. Documents client's compliance and comprehension to nutrition intervention and follow-up plan.	√	

Table 8. Continued

Duty	Task	Task element	Work activity	Basic	Recom-mended
D. Nutrition monitoring evaluation	D1. Monitoring of nutritional status	D1-1. Examines change of anthropometric measurements data	1. Examines change of anthropometric measurements data (eg. weight, waist circumference, body composition).	√	
		D1-2. Examines change of biochemical data	1. Examines change of dyslipidemia related biochemical data.	√	
			2. Examines change of nutrition-related biochemical data.		√
		D1-3. Examines nutrition-related clinical symptoms sings change	1. Examines nutrition-related clinical symptoms·sings change.	√	
		D1-4. Examines changes of dietary intakes	1. Examines improvement of dietary habit and changes of nutrients intakes	√	
		D1-5. Examines nutrition-related self-management	1. Checks the degree of nutrition-related self-management	√	
			2. Evaluate the implementation of nutrition intervention by examining dietary diary and lifestyle record		√
	D2. Monitoring of nutrition intervention process	D2-1. Checks whether intervention is being implemented as prescribed	1. Checks whether intervention is being implemented as prescribed.	√	
		D2-2. Checks whether nutrition intervention is being implemented as planed	1. Checks whether nutrition intervention is being implemented as planed.	√	
		D2-3. Examines positive or negative factors on nutrition intervention process	1. Examines positive or negative factors on planed nutrition intervention process (eg, clinical outcomes, staff coordination, family and social support level, content of nutritional care programs, etc.).		√
	D3. Evaluation of nutrition intervention	D3-1. Compares nutrition monitoring data with nutrition intervention goals	1. Compares nutrition monitoring data with nutrition intervention goals and evaluates goal attainment of intervention.	√	
		D3-2. Modifies nutrition intervention plan	1. Modifies nutrition intervention plans and goals according to nutrition intervention evaluation.	√	
			2. Establishes follow-up plans(schedules, contents, methods, monitoring tools etc.).		√
	D4. Documentation of nutrition monitoring evaluation	D4-1. Identifies nutrition monitoring evaluation standard terminology	1. Identifies nutrition monitoring evaluation standard terminology.	√	
		D4-2. Documents nutrition intervention results	1. Documents nutrition intervention processes and results.	√	
		D4-3. Documents modified nutrition intervention plan	1. Documents modified nutrition intervention goals and contents.	√	

Final version of job standards of clinical nutrition service for dyslipidemia

The draft job standards were shown to relevant institutions for advice and review, and, after field application evaluation and discussions, experts mainly suggested that the criteria for 'basic' and 'recommended' tasks need to be more specified; there are too many task elements and items in job description evaluation; and job standards for other diseases were needed as well. Also, the job standards and form developed based on field application evaluation were reviewed by institutions and all respondents were satisfied with the modified job standards. Later, based on field application evaluation and expert advice, the job standards were modified and supplemented, and the final job standards for clinical nutrition treatment of patients with dyslipidemia included 73 basic services and 26 recommended services, among 4 duties, 18 tasks, 53 task elements, and 99 job descriptions (Table 8).

Discussion

For the purpose of qualitative improvement of clinical nutrition service, in this study, the current status and practice of clinical nutrition service for dyslipidemia in Korean hospitals was studied, and job standards of clinical dietitians for clinical nutrition treatment of patients with dyslipidemia that can be applied to medical institutions were developed based on DACUM analysis and field application evaluation.

For dyslipidemia patients, it has been reported that improving diet through nutrition education and consultation can reduce risk factors and frequency of medication, and improve nutritional knowledge [27]. Therefore, clinical nutrition service provided by clinical dietitians has been reported to maximize treatment efficacy and reduce medical costs [15,28]. Also, clinical nutrition service for prevention and treatment of dyslipidemia is likely to become more important in the future as the prevalence of the disease grows every year. However, unlike in the U.S. where clinical nutrition service is applicable for health insurance benefits since 2002 [29], South Korea does not have no legislative policy relating to clinical dietitians and, therefore, does not insure the service. According to the result of this study, when patients receive nutrition education, individual education costs 24,487 KRW and group education 39,000 KRW. Therefore, if patients can receive insured clinical nutrition service, it may reduce prevalence and death rate of the disease.

Recently, it has been emphasized the tasks of clinical dietitians should be more specific and clear in order to activate services. A series of job activity analyses has been conducted for dietitians at schools, business places, hospitals, and health centers between 2002 and 2008 [23-25,30] and, in 2013, job standards of clinical dietitians at hospitals was developed [26] in Korea. This study was conducted based on previous research that suggested a wide range of tasks of clinical dietitians for overall diseases, and analyzed tasks that must be performed by clinical dietitians for clinical nutrition service of dyslipidemia. Here, to determine the tasks in a short period, the DACUM method was used, and the tasks and task elements were proposed according to the four steps of NCP, developed by AND (Academy of nutrition & dietetics, USA). This study may provide a manual for high quality clinical nutrition service by clinical dietitians performing standardized tasks, and to highlight the importance of clinical dietitians at hospitals who are in charge with diet and health management for patients.

The job standards for clinical nutrition treatment of patients with dyslipidemia proposed in this study include 4 duties, 18 tasks, 53 task elements, and 99 job descriptions, with less duties, tasks, and task elements than in the job description of clinical dietitians at hospitals developed by Cha et al. [26], which included 7 duties, 27 tasks, and 93 task elements. The tasks were reduced perhaps because the study was focused on tasks of clinical dietitians for a specific disease rather than overall diseases. Also, AND introduced job standardization for nutritional management since the early 2000s, and has published standard of practice (SOP) and standard of professional performance (SOPP) for clinical dietitians for various diseases [19,20]. While Cha et al. [26] proposed seven duties including nutrition assessment, nutritional diagnosis, nutrition intervention, nutrition monitoring and evaluation, consultation and cooperation, nutrition research, and self-development, this study, based on Korean and overseas studies, proposed four steps according to NCP; nutrition assessment, nutritional diagnosis, nutrition intervention, and nutrition monitoring and evaluation.

When the proposed job standards were applied to hospitals, the performance rate was high, average 68.3%, while the performance rate of nutrition monitoring and evaluation was the lowest, 28.2%. This low performance rate of nutrition monitoring and evaluation, despite the high importance can be explained by a lack of workforce and concentration on evalua-

tion and management of patients. It is believed that inefficient communication with the medical staff in overall hospitals can induce difficulties in clinical nutrition services [31].

Therefore, in this study, job standards for clinical dietitians for dyslipidemia patients at hospitals were developed based on tasks that are most necessary. However, authors believe that there are limitations in applying the proposed job standards to different regions with different medical staff and practices. However, if such limitations are improved and job standards of clinical dietitians are continuously developed, the recognition and status of clinical dietitians will be improved within the hospital and the nation.

Conclusion

The definition and job standards of clinical dietitians for dyslipidemia were made based on DACUM analysis. The job standards included 4 duties, according to the steps defined in NCP, 18 tasks, 53 task elements, and 99 job descriptions, with 73 basic services and 26 recommended services. The job standards for clinical nutrition treatment for patients with dyslipidemia developed in this study can be effectively used in clinical fields and also improve quality of clinical nutrition service and quality of life of patients with dyslipidemia.

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Conflict of Interests

No conflict interests were declared by any of the authors.

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