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Factors Related to Long-term Hospital Length of Stay and Opinions on Discharge-related Community-based Medical and Welfare Service on Elderly Patients with Chronic Diseases in Korean Veterans Hospitals

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Purpose: This study aims to investigate factors related to long-term length of stay (LOS) of patients with chronic diseases in Korean veterans hospitals. **Methods:** The subjects were 196 elderly patients with chronic disease staying in the hospital for more than 10 days, Data were collected by the survey of patients with structured questionnaires and medical records review by nurses from July 15 to August 10, 2019. Collected data were analyzed using t-test, ANOVA, Pearson's correlation coefficient and stepwise multiple regression. **Results:** The present and desired LOS were 37.78±32.66 days and 60.87±45.95 days, respectively. Factors affecting hospital LOS were found to be main disease (genitourinary) (p<.001), assistance in activities of daily living (p<.001), area of hospital (p<.001), payment of medical fees (p=.026), hospital satisfaction (p=.036) and the explanatory power of these variables was 26.4%. The most common health problems that need to be solved after discharge were symptom alleviation and health promotion. These problems can be solved using community-based facility services or visiting medical-welfare services (especially home care nursing). **Conclusion:** In order to reduce hospital LOS, the following measures are required: personalized self-management education, provision of transportation services for dialysis therapy of inactive patients, linking patients with visiting medical-welfare services including home care nursing and mobile healthcare services, operation of the case management system including the notice of the discharge date at admission, interim check of patient status, and connecting the patient with community resources or transferring the patient to long-term care facilities at discharge.

Key Words: Chronic disease; Aged; Length of stay; Veterans hospital

INTRODUCTION

1. Background

Veterans hospitals are public medical institutions established to provide healthcare services for patriots and veterans who made sacrifices for our country and their families, and six veterans hospitals including Seoul VHS (Veterans Health Service) Medical Center are being operated in six regions of Korea. Veterans hospitals have an established systematic healthcare delivery system that allows patients to receive primary care at consigned medical institutions close to home, secondary care at veterans hospitals in 5 noncapital areas, and tertiary care at Seoul VHS Medical Center equipped with specialized healthcare facilities, and provides patient-centered integrated health and welfare services through cooperation among veterans hospitals [1]. The integrated health and welfare services aim to provide services related to the continuum of care consisting of prevention, treatment, rehabilitation, long-term care, home-based care, and end-of-life care by organically connecting them with community-based services through the interconnection of the medical and welfare services of the Korea Veterans Welfare and Medical Care Corporation [2].

In Korea, the population aged 65 and over accounts for

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14.7% of the total population as of 2018, indicating that Korea has become an aged society [3]. The majority of the beneficiaries of benefits and services for patriots, veterans, and their families (henceforth MPVA (Ministry of Patriots and Veterans Affairs) beneficiaries) are wartime veterans that engaged in combat during a war. MPVA beneficiaries aged 65 or older are reported to be more than 0.5 million, and account for 73.9% of the total MPVA beneficiaries as of 2019 [4], and 93.4% of them are reported to be diagnosed with chronic diseases [5]. Elderly people use medical services including emergency rooms and hospitalization due to chronic diseases and deterioration in physical function [6], and long-term care due to these reasons results in an increase of hospital length of stay [7]. In elderly patients aged 65 or older among the users of health services covered by National Health Insurance, frequently diagnosed diseases of hospitalized patients are mostly acute diseases such as fractures [7]. However, in veterans hospitals, the most frequently diagnosed diseases of inpatients are chronic diseases [5]. The mean hospital length of stay of veterans hospitals is reported to be 35.3 days [5], which is longer than the mean hospital length of stay of 9.3 days in general hospitals [7]. The mean hospital length of stay of Seoul VHS Medical Center, a tertiary hospital, was found to be 17.6 days as of 2018 according to the results of an investigation by Seoul VHS Medical Center, and this value is also higher than the mean hospital length of stay of ordinary general hospitals [5].

Meanwhile, the management of length of stay in medical institutions can improve the financial conditions of hospitals by increasing the bed turnover rate, and can lead to the reduction of medical expenses and the improvement of quality of life through the use of outpatient treatment or home nursing care service after acute treatment [8]. The increase of the bed turnover rate makes it possible to rapidly provide inpatient care for patients waiting for hospital admissions and requiring acute treatment and to efficiently utilize limited medical resources. However, most users of veterans hospitals want to continue to stay in the hospital due to the benefits of the exemption or reduction of medical fees and good medical facilities and services [1]. For these reasons, veterans hospitals operate long-term care hospitals and nursing homes or operate hospitals by converting ordinary hospital beds into ones for long-term care to manage elderly patients with chronic diseases, and they are also establishing an integrated medical and welfare service system [2]. Koo et al. [2] reported that integrated medical and welfare services of veterans hospitals resulted in a lower hospital length of stay in the recipients of the services than nonrecipients, and the study attributed this result to the fact that recipients of the services become able to manage chronic diseases through the use of home nursing care service or visiting rehabilitation service or through the systematic use of outpatient services according to the prescription of physicians. Nevertheless, the majority of inpatients of veterans hospitals are patients with chronic diseases who need long-term care. According to a previous study of patients in Daegu VHS Medical Center, the mean hospital length of stay during the period of the past 6 months was 83.3 days in patients exempt from medical fees and 55.8 days in patients paying reduced medical fees due to government subsidy [9]. The study also reported that the influencing factor for hospital length of stay was the presence of out-of-pocket medical expenditure regardless of the degree of assistance in activities of daily living, and hospital wards with patients exempt from medical fees were practically being operated like long-term care wards [9]. In foreign healthcare facilities for veterans, home-based care services, such as visiting medical services [11] and telehealth which manages health status using traditional and digital communication devices [12], are being operated for the health management of elderly patients with chronic disease, and hospital use is mainly focused on acute treatment and medical expenses are managed through the case management of patients [13]. With respect to prolonged hospital length of stay in Korean veterans hospitals, patients' intention for discharge is important among patients exempt from medical fees unlike cases in foreign countries. Therefore, it is necessary to establish a linkage system for linking patients to community-based care services by identifying community-linked integrated medical and welfare services needed by patients after discharge.

In Korea, although the community care pilot project is being implemented, elderly patients discharged from hospitals have difficulty in settling in the community due to the lack of various care services including visiting treatment, visiting rehabilitation, nutritional support, and residential environment improvement that can provide support needed for elderly patients discharged from hospitals to return to the community [14]. Although veterans hospitals are also making efforts to establish an integrated medical and welfare care service system, it has been suggested that there is a need for the control function for veterans hospitals, welfare institutions, and administrative welfare centers as well as linkage between them and specialized institutions. It has also been proposed that it is necessary to establish a community care model for veterans medical and welfare services to ensure the continuous operation of home-based veterans welfare services in the community

social security systems [2]. Thus, this study aimed to investigate factors affecting hospital length of stay in elderly patients using veterans hospitals, identify community-linked integrated medical and welfare services needed by the participants after discharge in order to present basic data useful for the management of hospital length of stay and the future development and operation of intervention programs that utilize the accessibility of community resources.

2. Purpose

The specific objectives of this study are as follows:

- To investigate the general and disease-related characteristics of elderly long-term inpatients with chronic diseases of veterans hospitals, and examine differences in hospital length of stay according to these characteristics;
- to examine the levels of assistance of ADL, depression, anxiety, and hospital satisfaction as well as the relationship between each of these variables and hospital length of stay among elderly long-term inpatients with chronic diseases of veterans hospitals;
- to identify factors affecting hospital length of stay among elderly long-term inpatients with chronic diseases of veterans hospitals;
- to examine community-linked integrated medical and welfare services needed at discharge among elderly long-term inpatients with chronic diseases of veterans hospitals.

METHODS

1. Study Design

This study is a descriptive correlational study to investigate the general and disease-related characteristics of elderly long-term inpatients with chronic diseases using veterans hospitals and their needs for community-linked integrated medical and welfare services needed after discharge, and identify factors related to prolonged hospital length of stay in the participants.

2. Participants

The participants were patients with chronic disease hospitalized in veterans hospitals in Korea. Based on the mean hospital length of stay of 9.26 days in the inpatients of general hospitals in Korea as of 2017 [7], the participants were selected among elderly patients aged 65 years or older and hospitalized in veterans hospitals for 10 days due to chronic disease, and they were selected according to the following criteria. The participants were limited to persons who were not staying in the hospital for rehabilitation treatment, antibiotic therapy, chemotherapy, or special procedures, and could be discharged since they were in a sufficiently stable health condition to allow the patients to receive their current medical services from community facilities linked to veterans hospitals. In addition, only persons who were provided with explanations about the purpose and contents of the study and risks involved, fully understood them, and signed the written informed consent form were included in this study. The sample size was calculated using the G*Power 3.1.9 software, and it was determined to be 184 persons with the significance level (α) of .05, power (1-β) of .95, the median effect size of .15, and 12 independent variables. Thus, a total of 250 questionnaires were distributed by distributing 100 copies at Seoul VHS Medical Center and 30 copies at each of the veterans hospitals in noncapital areas because a high dropout rate of the questionnaires was expected as a result of conducting a survey at 6 hospitals. A total of 232 questionnaires were collected, and they included of 93 copies from patients of Seoul VHS Medical Center and 139 copies from patients of veterans hospitals in noncapital areas. Among them, a total of 196 copies of questionnaires were used for the final analysis, excluding 6 copies of the participants aged under 65 and 30 copies of patients with the present hospital length of stay of less than 10 days.

3. Data Collection

Data was collected from July 18, 2019 to August 10, 2019, and data collection was conducted in six veterans hospitals located in Seoul, Busan, Kwangju, Daegu, Daejeon, and Incheon. Regarding the method of data collection, a questionnaire survey was conducted among the patients of 6 veterans hospitals in Korea to collect data on general characteristics, the degree of assistance of activities of daily living (ADL), hospital satisfaction, desired hospital length of stay, and needs of community-linked integrated medical and welfare service. In the case of disease-related data, the nurse in charge of data collection of each hospital collected disease-related data through the review of medical records of the participants. Data collection was carried out by sending questionnaires to the nurse in charge of data collection of each hospital after the researcher explained the purpose, methods and procedure of the study to the hospital director and the head of the department of each hospital and obtained their approval and promise to cooperate. The contents of the questionnaire included the pur-

pose and methods of the study and contents about data collection. The nurse in charge of data collection was designated by each hospital, and the nurse provided explainations about the purpose and methods of the study and the guarantee of confidentiality of the data to the participants that met the participant inclusion criteria. During these explanations, the nurse showed the participant information sheet to the participants. She also explained to the participants that disease-related characteristics would be examined using medical records, the participants are allowed to withdraw from the survey and this study at any time if they want to, and the study results would be used only for the purpose of research. Then, after obtaining written informed consent from the participants, questionnaires were distributed to the participants to collect data. Although disease-related data was collected by the nurse in charge of data collection through the review of medical records of the patients, unclear contents of medical records were examined by asking attending physicians about them. In addition, in order to prevent errors in the interpretation of each item (general characteristics, disease-related characteristics, assistance of ADL, anxiety and depression, hospital satisfaction, desired hospital length of stay, and community-linked integrated medical and welfare service) and composition of the questionnaire, the nurse in charge of data collection of each hospital and the researcher met together before data collection to examine each item and discuss problems and questions about each item.

4. Measures

1) General and disease-related characteristics

The items on general characteristics consisted of 9 items on the following characteristics: gender, educational level, subjective economic status, presence of religion, presence of the spouse, presence of a job, presence of the main caregiver, area of the hospital (location of the hospital), and type of payment of medical fees. The type of payment of medical fees was examined by dividing it into complete exemption of medical fees and reduction of medical fees by government subsidy. The items on disease-related characteristics were 6 questions about the number of chronic diseases, kinds of present therapeutic diseases, presence of complications, present therapeutic aspect, and presence of discharge recommendation.

2) Assistance of activities of daily living (ADL)

Physical function was assessed by using 8 items on the degree of assistance in activities of daily living (ADL) from the Rapid Disability Rating Scale-2 developed by Linn & Linn [15]. The degree of assistance in ADL was assessed on a 4-point Likert scale ranging from 0 to 4 points. Higher scores indicate a poorer state of each physical function. Regarding the reliability of the instrument used to assess the level of assistance of ADL, Cronbach's α of each item ranged from 0.73 to 0.98 in the study by Linn & Linn [15], and Cronbach's α was .98 in this study.

3) Anxiety and depression

Anxiety and depression were measured using a Korean -translated, modified version of the Hospital Anxiety and Depression Scale (HADS) developed by Zigmond & Snaith [16]. The Korean version used in this study was developed by Oh et al. [17]. This scale is composed of a total of 14 items. Among them, odd-numbered items are questions to assess anxiety and even-numbered items are questions to assess depression. Each item was assessed on a 4-point Likert scale ranging from 0 to 3 points, and higher scores indicate higher levels of anxiety and depression. The Cronbach's α values of the anxiety and depression assessment tools were .86 and .82, respectively, in the study by Oh et al. [17] and they were .84 and .79, respectively, in this study.

4) Hospital satisfaction

Hospital satisfaction refers to the degree of satisfaction with medical services of the hospital [10]. By referring to the items of the hospital satisfaction assessment tool for the users of veterans hospitals developed by Kim & Lee [18], the researcher drafted the preliminary versions of 6 items about 6 major concepts: the degree of the solution of health problems, degree of physical comfort, degree of psychological comfort, intention to reuse the hospital after discharge, intention to recommend the use of the hospital to others, and overall satisfaction. The content validity of the developed tool was verified by 10 professors in nursing science and 10 hospital managers. The CVI value was calculated to be .96, so the six items were retained and used in this study without revision or deletion. The developed items were measured on a visual analog scale (VAS) ranging from 0 to 10 points, and higher scores indicate higher levels of hospital satisfaction. In this study, Cronbach's α of the instrument was .92.

5) Desired hospital Length of Stay (LOS)

Hospital length of stay refers to the number of days when the patient stays in the hospital, and it is used as an efficiency index in the operation of medical institutions. The mean hospital LOS refers to the total hospital length of stay of inpatients for 1 year divided by the number of dis-

charged patients or the number of inpatients for 1 year [19]. In this study, the operational definition of desired hospital length of stay is the value of hospital length of stay obtained by adding the additional period of hospital length of stay desired by the patient to present hospital length of stay.

6) Community-linked integrated medical and welfare services

Service linkage refers to the efforts made by institutions or organizations providing health or welfare services to provide service users with services in an integrated, continuous, and efficient manner by referring service targets to each other or requesting each other for service cooperation [2]. In this study, the operational definition of service linkage is whether the patient can be discharged if community-linked integrated medical and welfare services are provided and the needs of community-linked integrated medical and welfare service. In addition, attending physicians of the patients were surveyed to collect opinions on the directions of chronic disease management needed for the discharge of the patient.

5. Data Analysis

The statistical analysis of the collected data was performed using SPSS/WIN 24.0 program. The general and disease-related characteristics and community-linked integrated medical and welfare services needed after discharge of the participants were analyzed using descriptive statistics, such as real numbers, percentages, mean and standard deviation. In addition, the t-test or ANOVA was used to analyze differences in hospital LOS according to general and disease-related characteristics, and relationships between variables was analyzed using Pearson's correlation coefficient. Also, factors related to hospital LOS were analyzed using stepwise multiple linear regression. For variables that were found to be significant by ANOVA, post-hoc analysis was performed using the Scheffé test.

6. Ethical Considerations

Data collection was conducted after receiving approval from the IRB of central verterans hospital (2019-03-033-004) about the study purpose, methods, the participant information sheet, and the informed consent form. To increase the reliability of the described contents of the questionnaire, the participants were instructed to respond to the questionnaire anonymously, and put each copy of the completed questionnaires in an individual document envelope and seal the envelope to prevent the survey data from being exposed to others. The participants were given the explanation that the survey data as well as data obtained from medical records would be used only for the purpose of research, the personal information in the questionnaires would be encrypted and stored in a separate file of a locked computer to keep personal information confidential, and the questionnaires would be kept in a locked document box and shredded and discarded 3 years after the completion of this study.

The time taken for the completion of the questionnaire was about 5 minutes for nurses in charge of data collection and about 15 minutes for patients. For the participants who were unable to read and understand Korean, the nurse in charge of data collection read the contents of each item of the questionnaire for them and checked responses to each question. After the questionnaire was completed, each participant was given a small gift as a token of appreciation.

RESULTS

1. General Characteristics and Hospital Length of Stay (LOS) according to These Variables

The present hospital LOS and desired LOS of the participants were 37.78±32.66 days and 60.87±45.95 days, respectively. With respect to general characteristics, for gender, males accounted for 90.3% of the total participants. As for educational level, middle school graduates or lower accounted for 53.1%. In subjective economic status, 67.7% rated their subjective economic status as poor. In addition, 67.7% had no religious belief and 94.9% were married in marital status. Also, 90.3% had no occupations, and the main caregiver was the spouse in 67.3%. Regarding payment of medical fees, 62.9% were completely exempt from medical fees. As to the region of the hospital, 58.2% of the participants were inpatients of hospitals in non-capital areas (Table 1).

Regarding differences in the length of hospital stay according to general characteristics, there was a significant increase in the desired length of hospital stay when the main caregiver was the spouse (t=2.48, p=.014), when patients were exempt form medical fees (t=2.40, p=.018), and when the hospital was located in a noncapial area (t=2.78, p=.006) (Table 1).

2. Disease-related Characteristics and Hospital Length of Stay (LOS) according to These Variables

With respect to disease-related characteristics, the num-

Table 1. General Characteristics and Differences in Hospital Length of Stay according to them (*N*=196)

Variables	Categories	n (%)	Present hospital LOS			Desired hospital LOS		
			M±SD	t or F	*p*	M±SD	t or F	*p*
Hospital stay			37.78±32.66			60.87±45.95		
Gender	Male	177 (90.3)	38.21±32.89	0.56	.576	61.20±46.81	0.29	.775
	Female	19 (9.7)	33.39±30.98			57.82±38.11		
Education	≤Middle school	104 (53.1)	35.42±30.93	0.58	.561	59.10±45.71	0.24	.787
	High school	72 (36.7)	40.28±35.88			61.52±47.80		
	≥College	20 (10.2)	41.05±29.74			67.17±41.71		
Subjective economic status†	Poor	128 (67.7)	38.19±32.93	0.10	.904	60.90±43.58	0.07	.936
	Average	46 (24.4)	37.43±33.53			63.93±53.21		
	Enough	15 (7.9)	39.87±34.27			61.77±49.54		
Religion†	No	132 (67.7)	35.30±29.70	1.57	.117	56.97±41.72	1.63	.105
	Yes	63 (32.3)	43.16±38.03			69.11±53.56		
Marital status	Married person	186 (94.9)	35.30±29.70	1.57	.117	57.97±47.72	1.63	.105
	Others	10 (5.1)	43.16±38.03			69.11±53.56		
Job	No	177 (90.3)	38.30±33.49	0.68	.499	62.69±46.85	1.60	.111
	Yes	19 (9.7)	32.95±23.73			44.00±33.03		
Main caregiver	Spouse	132 (67.3)	40.73±33.55	1.91	.058	64.65±46.08	2.48	.014
	Others	64 (32.7)	31.28±30.06			49.00±34.67		
Payment of medical fee†	Exemption	122 (62.9)	39.44±31.17	0.93	.356	65.68±48.66	2.40	.018
	Reduction	72 (37.1)	34.93±35.48			50.33±350.3		
Area of hospital	Central hospital	82 (41.8)	33.67±30.65	1.50	.135	49.70±40.79	2.78	.006
	Province hospital	114 (58.2)	40.74±33.86			68.94±47.93		

LOS=length of stay; †Non Respondent Excluded.

ber of chronic diseases was 3 or more in 30.1%, and the mean number of diseases was 2.9. Regarding present therapeutic diseases, the proportion of cardiovascular disease was highest at 59.7%, followed by endocrine and metabolic diseases including diabetes, respiratory disease, and genitourinary disease. As to therapeutic aspect at admission, treatment provided to the patient at admission was acute treatment in 35.7% of participants, symptom control requiring medical facilities in 30.1%, and symptom control feasible at home in 30.1%. Meanwhile, present therapeutic aspect was acute treatment in 35.2%, symptom control requiring medical facilities in 18.9%, and symptom control feasible at home in 45.9%, and patients that received discharge recommendation accounted for 31.6% (Table 2).

Table 2 shows disease-related characteristics affecting hospital LOS. Hospital LOS was higher in the group with two or chronic diseases than in the group with one chronic disease (F=2.51, p=.025). In addition, hospital LOS was higher when the primary disease is a genitourinary disease than when it was other kinds of disease (t=3.21, p=.002). It was also higher in the group with complications than in the group without complications (t=2.02, p=.048). As for desired hospital LOS, regarding therapeutic aspect at admission, desired hospital LOS was highest in the group with the feasibility of symptom control at home, followed by the group without the feasibility of symptom control at home and the acute treatment group (F=3.12, p=.047). In terms of the present therapeutic aspect, desired hospital LOS stay was highest in the group with the feasibility of symptom control at home, followed by the acute treatment group and the group without the feasibility of symptom control at home (F=3.34, p=.038). In addition, desired hospital LOS was significantly longer in the group with recommendation of discharge from medical staff than the group without recommendation of discharge (t=2.04, p=.043).

3. Assistance of ADL, Anxiety, Depression, Hospital Satisfaction, and Relationships between These Variables and Hospital Length of Stay (LOS)

In the participants of this study, the level of assistance of ADL was 5.38±7.28 out of 24 points, the levels of anxiety and depression were 1.00±0.68 out of 3 points and 1.34±0.81 out of 3 points, respectively. The level of hospital satisfaction was 8.18±1.76 out of 10 points. Hospital length of

Table 2. Present Disease-related Characteristics and Differences for Hospital Length of Stay according to Them (*N*=196)

Variables	Categories	n (%)	Present hospital LOS		Desired hospital LOS	
			M±SD	t or F (*p*)	M±SD	t or F (*p*)
Number of chronic disease (mean 2.9)	1[a]	70 (35.7)	31.04±24.68	2.51 (.025)	50.13±31.61	3.12 (.035)
	2[b]	67 (34.2)	43.10±38.42	a < c, b	67.71±56.52	a < b, c
	≥3[c]	59 (30.1)	39.69±33.04		67.81±46.66	
Present therapeutic disease* (Yes only)	Endocrine, nutritional, metabolic diseases	97 (49.5)	38.99±36.29	0.52 (.605)	61.31±46.12	0.12 (.903)
	Digestive diseases	27 (13.8)	36.00±37.01	0.25 (.803)	63.97±48.75	0.72 (.472)
	Respiratory diseases	47 (24.0)	35.98±28.26	0.40 (.692)	61.31±46.12	0.44 (.639)
	Cardiovascular diseases	117 (59.7)	39.43±35.46	0.93 (356)	63.27±48.05	0.85 (.397)
	Genitourinary diseases	54 (27.6)	57.38±36.14	3.21 (.002)	100.25±63.08	3.08 (.006)
	Cerebrovascular diseases	32 (16.3)	39.53±24.00	0.23 (.818)	65.42±48.38	1.93 (.055)
	Neoplasm, malignant diseases	31 (15.8)	36.92±32.56	0.18 (.855)	52.83±36.49	1.78 (.240)
	Others	29 (14.8)	26.72±17.82	3.19 (.036)	58.64±45.76	0.26 (.794)
Therapeutic aspect at admission	Acute treatment[†a]	70 (35.7)	31.07±24.68	0.51 (084)	50.13±31.61	3.12 (.047)
	Symptom control at home is unfeasible[‡b]	67 (34.2)	43.10±38.42		67.71±56.52	a < b < c
	Symptom control at home is feasible[§c]	59 (30.1)	39.69±33.04		67.81±46.61	
Complication	No	154 (78.6)	34.86±29.49	2.02 (.048)	57.74±44.63	1.74 (.084)
	Yes	42 (21.4)	48.50±40.95		72.46±49.43	
Therapeutic aspect at present	Acute treatment[†a]	69 (35.2)	38.03±38.26	0.54 (.587)	53.38±43.69	3.34 (.038)
	Symptom control at home is unfeasible[‡b]	37 (18.9)	32.97±27.40		51.45±35.01	b < a < c
	Symptom control at home is feasible[§c]	90 (45.9)	39.57±30.03		70.46±50.03	
Recommendation of discharge	No	134 (68.4)	40.25±35.70	1.79 (.076)	50.77±38.22	2.04 (.043)
	Yes	62 (31.6)	32.45±24.26		65.79±48.67	

Non respondent excluded; LOS=length of stay; [†]Antibiotics treatment, Anticancer treatment, operation and procedure; [‡]Required close observation or special equipment (ex: transfusion, dialysis, body fluid tapping etc); [§]General supportive care (ex: infusion therapy, tube change etc).

Table 3. Assistance of ADL, Anxiety, Depression, Hospital Satisfaction, and Their Correlations with Hospital Length of Stay (*N*=196)

Variables	M±SD	Correlations	
		Present hospital LOS	Desired hospital LOS
		r (*p*)	r (*p*)
Assistance of ADL	5.38±7.28	.22 (.002)	.23 (.002)
Anxiety	1.00±0.68	.17 (.020)	.13 (.091)
Depression	1.34±0.81	.20 (.006)	.22 (.004)
Hospital satisfaction	8.18±1.76	-.12 (.106)	-.14 (.076)

Non respondent excluded; LOS=length of stay; ADL=activity of daily living.

stay showed a significant but weak relationship with the degree of assistance of ADL and depression (Table 3).

4. Factors affecting hospital length of stay (LOS) in elderly Long-term Inpatients with Chronic Diseases

To identify specific predictor variables affecting hospital LOS in elderly long-term inpatients with chronic diseases, variables related to hospital LOS among general and disease-related characteristics were set as independent variables. More specifically, general characteristics such as main caregiver, payment of medical fees, and area of the hospital and disease-related characteristics such as the number of chronic diseases, therapeutic aspect at admission, present therapeutic aspect, and presence of genitourinary illness were used as independent variables. In addition, the degree of assistance of ADL, anxiety, depression, and hospital satisfaction, which were presumed to be related to hospital LOS, were also set as independent variables, and these variables were entered and analyzed in a hierarchical manner. Variables measured on a nonimal scale (main caregiver, area of hospital, payment of medical

fees, presence of chronic genitourinary disease, and therapeutic aspect) were analyzed by treating them as dummy variables, and reference values were set as 'the non-spouse caregiver for the main caregiver', 'Seoul for the region of hospital', 'reduction of medical fees for payment of medical fees', 'non-genitourinary diseases for the main disease', and 'acute treatment for therapeutic aspects.' Tests for checking the assumptions of regression analysis were performed before conducting stepwise regression analysis, and the results showed that the assumptions were all satisfied. The Durbin-Watson test was used to test autocorrelation for the dependent variable, and the Durbin- Watson value was determined as 1.64, indicating that there was no autocorrelation. To assess multicollinearity between independent variables, the variance inflation factor (VIF) was calculated, and the VIF value ranged from 1.00 to 1.19, values less than 10, indicating that there is no multicollinearity between independent variables. As a result, it was confirmed that the data of this study was suitable for regression analysis. In addition, residual analysis was conducted to confirm the suitability of the model, and the results showed that the assumptions of normality and equal variance were satisfied. The factors related to desired hospital LOS in elderly long-term inpatients of veterans hospitals were found to be urologic disease, assistance of ADL, area of hospital, payment of medical fees, and hospital satisfaction. The explanatory power of each factor was as follows: urologic disease (β=.30, p <.001), assistance of ADL (β=.34, p <.001), region of hospital (β=.31, p <.001), type of payment of medical fees (β=.15, p =.026), and hospital satisfaction (β=-.14, p =.036). The adjusted explanatory power of these variables was 26.4% (F=13.30, p <.001) (Table 4).

5. Needs of Discharge-related Community-linked Integrated Medical and Welfare Services

Table 5 shows the needs of community-linked integrated medical and welfare services in relation to discharge among elderly patients with chronic diseases. As for opinions of medical staff on the directions of the management of chronic diseases needed for discharge of the participants, alleviation of symptoms (56.2%) accounted for the largest proportion of the responses, followed by simple health management (16.5%). 52.0% of respondents answered that their discharge would be possible if they were able to receive medical services linked to community integrated medical and welfare services. Among 102 respondents that expressed the possibility of discharge, regarding the type of care needed after discharge, 55.9% wanted to receive facility-based care, and the most needed type of facility was long-term care hospitals, followed by rehabilitation institutions, and nursing homes. 41.0% wanted to receive visiting care, and in the case of visiting care, the largest proportion of patients needed home nursing care. In response to the question about the necessity for community-linked integrated healthcare after discharge, 90.8% of respondents answered positively. Regarding the needs of community-linked integrated medical and welfare services, 67.4% of patients wanted home nursing care. As to the contents of home nursing service, the proportion of observations of the disease state was highest at 83.3%, and other services needed by at least 10% of patients were infusion or injection therapy (29.2%), counseling (15.9%), rehabilitation treatment (14.2%), and wound care (13.7%). Some participants needed transportation services for dialysis, blood transfusion or abdominal paracentesis. Regarding self-

Table 4. Factors related to Estimated Hospital Length of Stay (*N*=196)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
	β (p)	β (p)	β (p)	β (p)	β (p)
Main disease (Genitourinary disease)	0.33 (< .001)	0.32 (< .001)	0.31 (< .001)	0.30 (< .001)	0.30 (< .001)
Assistance of ADL		0.24 (< .001)	0.35 (< .001)	0.36 (< .001)	0.34 (< .001)
Area of hospital †			0.31 (< .001)	0.29 (< .001)	0.31 (< .001)
Payment of medical fee †				0.14 (.034)	0.15 (.026)
Hospital satisfaction					-0.14 (.036)
F (p)	20.20 (< .001)	16.73 (< .001)	18.32 (< .001)	15.18 (< .001)	13.30 (< .001)
R^2	.11	.17	.25	.27	.29
Adjusted R^2	.10	.16	.23	.25	.26

Non respondent excluded; ADL=Activity of daily living; †Dummy variables: Main disease (non-Genitourinary diseases=0, Genitourinary diseases=1), Area of hospital (Seoul=0, province=1), Payment of medical fee (Reduction=0, Exemption=1), ADL=Activity of daily living.

Table 5. Discharge related Opinion and Requiring Community Linked Medical-Welfare Service after Discharge (*N*=196)

Items	Divisions			n (%)
Opinion of medical person on discharge				
Health problem that need to be solved to discharge †	Acute procedure and close observation			37 (19.1)
	Medical procedure only (dialysis, transfusion, ascites tapping etc)			16 (8.2)
	Alleviation of symptom			109 (56.2)
	Which problem	Pulmonary related symptom (esp dyspnea)		22 (20.2)
		Pain		26 (23.9)
		Blood glucose		24 (22.0)
		Wound care (included DM foot)		7 (6.4)
		Rehabilitation		11 (10.1)
		Others (tube change, poor oral intake, languor etc)		19 (17.4)
	Health promotion			32 (16.5)
Opinion of patient on discharge				
Possibility of discharge if linked to community service and service needed	No			94 (48.0)
	Yes			102 (52.0)
	Service needed	Facility	Elderly care hospital	40 (39.2)
			Nursing home	6 (5.9)
			Rehabilitation institute	11 (10.8)
		Visiting	Visiting nursing	37 (36.3)
			Visiting rehabilitation	8 (7.8)
Required hospital linked visiting service when discharge	No			18 (9.2)
	Yes			178 (90.8)
	Which service	Home care nursing		120 (67.4)
		Visiting hospice care		24 (13.5)
		Visiting rehabilitation		5 (2.8)
		Visiting assistive devices		16 (9.0)
		Visiting preventive dementia		13 (7.3)
Detailed service by home care nursing †	Close observation			187 (83.3)
	Injection and fluid therapy			68 (29.2)
	Rehabilitative therapy			33 (14.2)
	Wound and ulcer treatment			32 (13.7)
	Oxygen treatment			22 (9.4)
	Change of tracheostomy foley, nasogastric tube etc			21 (9.0)
	HMV management			10 (4.3)
	Counselling			37 (15.9)
Transfer service for dialysis. transfusion, ascite tapping				15 (6.0)
Self care † Educational experience	No			108 (55.7)
	Yes			86 (44.3)
Educational need	No			131 (67.5)
	Yes			63 (32.5)

† Non Respondent Excluded; ‡ Multiple response.

management for chronic disease management, 55.7% of the total participants did not have the experience of self-management education, and 67.5% did not have any intention to receive self-management education, constituting a larger proportion than the group with an intention to receive self-management education (Table 5).

DISCUSSION

This study attempted to explore factors related to hospital LOS among elderly long-term inpatients with chronic diseases aged 65 years and older in veterans hospitals, and investigate the needs of community-linked integrated medical and welfare services in relation to discharge among the participants. The implications of study results can be described as follows.

With respect to the general characteristics of elderly patients with chronic diseases aged 65 years and older using veterans hospitals, the mean present hospital LOS was 37.78 days. This value is much higher compared to the mean hospital LOS of 17.1 days as of 2017 among patients all medical institutions equipped with admission facilities in Korea [7]. In a previous study, the mean hospital LOS by age was found to be 20 or more days in the age group aged 70 and older, 39.3 days in the 80~84 age group, and 72.9 days in the group aged 85 and older [6], reflecting the tendency that the mean hospital LOs increases with the increase of the age of patients. As described above, aging increases the prevalence and severity of chronic diseases, and thus influences the use of medical services and medical expenditure [8,19]. Since the proportion of the elderly population and the prevalence rate of complex chronic diseases are higher in MPVA beneficiaries than in the total population of Korea [20], hospital LOS is thought to be higher in veterans hospitals than in ordinary medical institutions.

In terms of sufficiency of the use of medical services, the level of hospital satisfaction was as high as 8.22 out of 10 points, and it was found to be a factor inversely correlated with hospital LOS. It has been reported that the level of hospital satisfaction affects the reduction of hospital LOS, and increases the intention to reuse the hospital, thereby playing a positive role in medical revenue [21]. As patients with a high level of hospital satisfaction more easily accept the recommendation of discharge by medical staff and cooperate, hospital satisfaction is thought to influence the reduction of hospital LOS. Thus, veterans hospitals with a high hospital LOS are required to explore various methods for improving hospital satisfaction.

In this study, to explore methods for reducing hospital LOS in elderly inpatients with chronic diseases staying in the hospital for a long period, opinions on discharge were examined among medical staff taking care of patients as well as patients. In terms of opinions of medical staff on the directions of management of chronic diseases needed for discharge of the participants, alleviation of symptoms of chronic conditions (56.2%) took up a much larger proportion than alleviation of acute health problems (19.1%), and 16% of medical staff responded that simple health management was required. Shin [20] reported that the reason for hospitalization of chronic patients using veterans hospitals was found to be the inconvenience of outpatient treatment in 64.7%, the inconvenience of the patient's own residence in 8.4%, and the convenience of the provision of accommodation and meals in 6.6%. These results are thought to be due to the fact that the inpatients of veterans hospitals have no burden of medical expenses or only a small burden of medical expenses because they are exempt for medical fees or have their medical services partially subsidized by the government. As the majority of MPVA beneficiaries have reached old age, their dependence on medical institutions due to chronic diseases is increasing [2]. It is required to make changes in perception about the use of medical institutions of MPVA beneficiaries so that veterans hospitals will be operated centered on patients who need to solve acute health problems. In addition, veterans hospitals should strengthen community-linked integrated medical and welfare services for MPVA beneficiaries who need simple health management and also explore methods for gradually restricting their use of medical services.

In this study, desired hospital LOS, which reflects additional hospital LOS expected by the patient, was 60.87 days. With respect to desired hospital LOS according to general characteristics, desired hospital length of stay was higher when the main caregiver was the spouse, when the patients were exempt from medical fees, and when the region of the hospital was a non-capital area. In this study, the main caregiver was the spouse in 67.3% of patients. This result is similar to the findings of a previous study that the main caregiver was the spouse in 64.9% of the inpatients of veterans hospitals, and the age of the main caregiver was 60 years or more in 39% of the participants [22]. The spouse is the most comfortable person for the patient among the family members, and when a husband or wife is hospitalized, the spouse stays near the patient as the physical or psychological caregiver. As a result, the spouse of the patient may experience an increased level of stress due to the burden of caregiving and restrictions on his or her personal life [23]. In particular, 79% of the spous-

es of inpatients of veterans hospitals were found to feel stressed, the primary cause of increased stress was the financial burden, and 44.8% responded that there were no methods to cope with their increased stress. Therefore, there is a need to pay more attention to caregivers of patients, especially their spouses, and provide interventions to decrease their burden and stress levels. In addition, it is necessary to expand the integrated nursing care service wards of veterans hospitals through a long-term plan.

The use of medical services has been reported to be higher among economically disadvantaged groups [24]. In this study, there was no significant difference in desired hospital LOS depending on socioeconomic status. However, regarding payment of medical fees, the desired hospital LOS was significantly higher in the group exempted from medical fees by the government than in the group paying reduced medical fees due to government subsidy, and thus payment of medical fees was found to be a factor affecting the desired hospital LOS. Since veterans hospitals are a type of public medical institutions established for a special purpose, it is not difficult to make a comparison with the results of the present study with those of other studies in the same conditions. However, the result of this study described above is consistent with the results of a study by Son & Kim [23], which reported that the mean hospital LOS was higher in the group of medical aid beneficiaries with a smaller burden of out-of-pocket health expenditure than patients in the bottom 20% of those enrolled in the National Health Insurance. According to a previous study using data from the Health Insurance Review & Assessment Service, the concentration strategy on inpatient treatment was shown to increase the bed turnover rate, and was also found to have a positive impact on health outcomes even in terms of the treatment outcomes of patients [25]. Veterans hospitals also need to use a concentration strategy tailored to the characteristics of each hospital, and as a part of this concentration strategy, they need to give patients a prior notice of the discharge date at admission, perform an interim check-up of the patient's condition focused on discharge, activate integrated medical and welfare services which link the health care of patients with local community services after discharge in order to induce early discharge of patients.

As for the desired hospital LOS according to region of hospital, the desired hospital LOS was higher in the veterans hospital located in Seoul than in those in other areas. This result is presumed to be due to the fact that since the bed occupancy rate of veterans hospitals in noncapital areas is as low as 90% or less [5], elderly chronic disease patients with reduced physical function request medical staff for the extension of their stay in the hospital, these requests are likely to be easily accommodated, which may lead to prolonged hospital LOS. In addition, there may be the impact of the tendency that veterans hospitals in noncapital areas allow patients to stay in the hospital for an extended period in order to maintain stable revenue by increasing hospital LOS regardless of patients' conditions or need for care [2,9,10]. Nevertheless, veterans hospitals in noncapital areas have been experiencing many difficulties in the operation of the hospital due to a reduction in hospital charges for inpatients and a decrease in daily medical expenses resulting from prolonged hospital length of stay of patients [2]. In this connection, Kim et al. [5] examined the status of the operation of veterans hospitals, and proposed the method of converting the functions of hospitals into hospitals for acute treatment, long-term care hospitals, and nursing homes according to the bed occupancy rate of each hospital in order to meet the needs of inpatients and patients waiting for hospital admissions and increase the efficiency of hospital operation. According to Koo et al. [2], when integrated medical and welfare services were implemented in a veterans hospital located in a noncapital area for 1 year, hospital LOS was decreased from 117 days before the introduction of the services to 76 days 1 year after the implementation of the services. The integrated medical and welfare services are intended to provide the continuum of care comprised of prevention, treatment, rehabilitation care, home-based care and end-of-life care by organically connecting them with community services, and when these integrated medical and welfare services. These findings of previous studies suggest that regional veterans hospitals with a low bed occupancy rate need to make innovative structural changes such as the adjustment of the functions of hospital beds by reducing the number of beds for acute treatment and expanding long-term care facilities or nursing homes. In addition, they need to explore methods for activating integrated medical and welfare services. In Seoul VHS Medical Center with a bed occupancy rate of more than 90%, patients requiring inpatient treatment due to acute diseases cannot be admitted to the hospital in a timely manner due to the patients' very high LOS, so it is an essetional task of this institution to reduce the hospital LOS of its patients. To achieve this goal, Seoul VHS Medical Center is required to provide the users of the hospital with specific information about guidelines on the use of the hospital and the current status of the present hospital LOS. It is also required to actively perform a promotional activity to increase the awarenes of users on the importance of the considerate behavior of sharing, and introduce and try to strictly observe the

discharge date notice system of notifying each patient of an expected discharge date at admission.

In this study, the desired hospital LOS was higher in the group with symptoms that could be controlled at home or in the group of patients that medical staff thought were currently able to be discharged. The level of assistance of ADL in the participants was 5.38 out of 24 points. Assistance of ADL had a weak correlation with desired hospital LOS, and it was a factor affecting the desired hospital LOS. Assistance of ADL in this study is a concept similar to impairment in ADL. A study by Choi & Hwang [26] reported that the degree of impairment in ADL among elderly people residing in rural areas was 2.01±0.82 out of 5 points. Compared to the results of Choi & Hwang [26], the degree of assistance of ADL in this study was relatively lower. On the other hand, the degree of assistance of ADL was found to be closely correlated with depression. According to a previous study, the degree of assistance of ADL is closely correlated with depression, and a higher level of depression is associated with a higher degree of dependency in ADL [27]. Also, the presence of multiple chronic diseases has been reported to influence depression [28]. Elderly patients with complex chronic diseases and problems with activities of daily living may develop a negative psychological state during the hospital stay, so it is required to provide nursing care that can motivate patients to perform activities of daily living for themselves through self-management education along with the comprehensive assessment of the conditions of the patient including depression.

52.0% of the participants responded that they could be discharged if they were linked to community integrated medical and welfare services. As to health problems that need to be solved for discharge of patients, alleviation of symptoms was found to be the most common reason for hospitalization. With respect to the needs of community-linked integrated medical and welfare services, 55.9% needed facility-based care services such as long-term care hospitals or nursing homes, and 44.1% wanted visiting care services. However, the participants desired to continue to stay in veterans hospitals. In this connection, Shin [20] also reported that the largest proportion of MPVA beneficiaries wanted to use veterans long-term care facilities among healthcare service facilities linked to veterans hospitals. Regarding the type of visiting care, the respondents had the greatest need for home nursing care service linked to veterans hospitals. As to the type of service that the participants wanted to receive through home nursing care, the demand for observation of the disease state was highest. In other words, the participants showed a strong need for community-linked integrated medical and welfare services connected to veterans hospitals. These results are thought to show that elderly patients who are MPVA beneficiaries want to manage their chronic conditions through facility-based care or home nursing care linked to veterans hospitals because of their anxiety about discharge related to health concerns due to chronic diseases and aging. The integrated medical and welfare services provided by the veterans hospitals was introduced in 2009, and these services were composed of home-based care services, medical and welfare services, and community-based care services with the aim of providing personalized integrated medical and welfare services tailored to the disease state of individual MPVA beneficiaries in 2015. It was reported that after the implementation of the integrated medical and welfare services of veterans hospitals, the uses of home nursing care and visiting rehabilitation services were increased, leading to a decrease in hospital LOS and an increase in the number of outpatient treatment cases among MPVA beneficiaries. However, there was a limitation in increasing the recipients of integrated medical and welfare services with the limited resources of veterans hospitals. Therefore, it is necessary to enable patients to sufficiently utilize medical and welfare services in all the regions by linking patients to various public and private resources of the community, including medical services, long-term care, and home-based service facilities [2]. To resolve the anxiety about care of the elderly, the government has been implementing the community integrated care service pilot project in pilot project cities to drastically improve housing, medical services, and long-term care services since 2019. According to a report of a successful case of community-based integrated care services, it was reported that an elderly person living alone who had been hospitalized in a long-term care hospital for a long period was discharged from the hospital and became able to stay at home through integrated support comprised of various integrated home-based care services including meal services, nursing care, and transportation services, and the elderly person living alone overcame problems with activities of daily living and regained vitality in life while receiving services such as visiting nursing care and long-term care at home, and thus was satisfied with staying at home [14]. Therefore, as community-based integrated care services are being expanded across the country, veterans hospitals are required to strengthen linkage between veterans hospitals and the general healthcare system and actively proceed with the introduction of the care manager system for linking patients with community resources at discharge in order to encourage and help elderly patients with chronic diseases to utilize community-based integrated care serv-

ices conveniently after discharge.

In addition, for patients to readily accept community-based integrated medical and welfare services, they need to be equipped with the ability to self-manage their chronic health conditions. In this study, only 31.6% of the participants had the experience of self-management education, and the level of needs for self-management education was as low as 32.5%. A study of patients in the bottom 20% of people enrolled in the National Health Insurance found that a high percentage of patients are hospitalized due to preventable chronic diseases [29]. The management method of chronic diseases used in Korea is to provide comprehensive care focused on health needs of patients and centered on primary medical institutions by establishing a comprehensive, continuous, and patient-centered care plan. To properly manage chronic diseases, patients themselves are required to gain sufficient knowledge about disease management and manage their chronic conditions. However, the levels of motivation and practice of self-management have been reported to be lower in the vulnerable group who need this self-management ability [30]. Therefore, it is essential to improve the patients' ability to self-manage chronic conditions to prevent re-hospitalization, so it is important to implement self-management education tailored to characteristics of chronic diseases and monitor and check each patient's proper performance of self-management. In addition, in consideration of cases where an admission to a facility is required due to the difficulty of disease management by home-based care, it is suggested to expand consigned long-term care facilities of veterans hospitals and secure and use the list of consigned long-term care facilities of veterans hospitals. This method will allow patients to receive long-term care services needed in a facility close to home.

In elderly inpatients with chronic diseases of veterans hospitals, the type of the main caregiver, area of the hospital, type of payment of medical fees, presence of chronic urologic diseases, degree of assistance of ADL, and hospital satisfaction were identified as factors related to prolonged hospital LOS. The participants wanted to continue to receive integrated medical and welfare services linked to veterans hospitals after discharge. Therefore, it is suggested to establish and operate the community-linked integrated medical and welfare service system to allow elderly patients with chronic diseases to solve their healthcare problems at home by utilizing services such as veterans long-term care facilities, visiting nursing or mobile healthcare services.

This study has the following limitations. First, study results were not based on empirical data since hospital LOS was defined not as the actual hospital LOS but as the desired hospital LOS. Second, in the determination of hospital LOS by disease types, concurrent diseases were not taken into account when hospital LOS was derived. Third, this study did not control for differences among hospitals, and could not present the mean age of participants, either, so there are other factors related to hospital length of stay that were not taken into account in this study. In addition, the normality of the present and desired hospital LOS was assessed only by the skewness and kurtosis analysis of residuals. Therefore, it is necessary to take into account these limitations in generalizing the findings of this study. However, this study conducted a comprehensive survey close to a complete enumeration survey among elderly inpatients with chronic diseases hospitalized in veterans hospitals distributed across the country, and investigated influencing factors of prolonged hospital LOS and needs of integrated medical and welfare services among elderly inpatients with chronic diseases in veterans hospitals as a type of special-purpose medical institutions.

CONCLUSION

This study attempted to explore factors affecting hospital LOS and investigate discharge-related opinions on community-linked integrated medical and welfare services among elderly long-term inpatients aged 65 and older with chronic diseases. As a result, the type of the main caregiver, the area of the hospital, the type of payment of medical fees, the presence of chronic urologic diseases, the degree of assistance of activities of daily living (ADL), and the hospital satisfaction were identified as factors influencing hospital LOS, and the explanatory power of these variables was 26.4%.

To manage the hospital LOS of elderly long-term inpatients, there is a need to establish a community-based integrated medical and welfare service system to allow patients with kidney diseases requiring dialysis to utilize visiting nursing or mobile healthcare services linked to veterans hospitals. In addition, it is also necessary to reduce needs for hospital admission through proactive management through self-management education for patients with chronic diseases based on a lone-term plan. To prevent the prolonged length of hospital stay of elderly patients with chronic diseases, there is a need to take measures such as the discharge date notice system of notifying the patient of the discharge date at admission, interim check-up to examine the completion status of acute-phase treatment, and operation of the care manager system for linkingthe patient with appropriate community resources

such as home-based care or healthcare facilities according to the conditions of the patient at discharge.

Based on study results described above, the following suggestions are presented. First, a discharge management system should be established based on indicators regarding the conditions and treatment of patients in order to prevent prolonged length of hospital stay in patients with chronic diseases likely to stay in the hospital for a long period. Second, there is a need to develop and apply an integrated medical and welfare service system in which hospitals intervene in the process of linking various services needed by patients after discharge to community resources. Third, this study did not take into consideration the status of completion of management indicators for chronic diseases and the level of severity of diseases, so further research is required to investigate influencing factors for length of stay by performing adjustment for these variables.

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