

A Study on the Characteristics of Main Diagnoses of Died Patients

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Abstract

Objectives: The purpose of this study is to provide preliminary data as to the relevance of main diagnoses and death rate with age and cause of death and hospitalization type in South Korea. **Methods/Analysis:** This study selected the 707 died patients out of those patients who had visited the university hospital from January 1 to December 31 2013. **Findings:** First, this study aims to identify the characteristics of died patients by analyzing the general characteristics of study subjects. Second, this study aims to examine the hospitalization type of died patients by analyzing the characteristics of hospitalization type. Third, this study aims to examine which diagnosis result accounted for the highest proportion for death by analyzing the main diagnoses of died patients. Fourth, this study aims to examine the correlation between the items by conducting correlation analysis on each item as to the hospitalization type. **Conclusion/Application:** It is believed that it will be possible to manage hospitals and establish national health policies more efficiently by leveraging the above-stated statistical analysis data on died patients.

Keywords: Dead, Medical Information, Medical Record

1. Introduction

Health statistics is an important index to evaluate the quality of physical and mental health of human beings. It also becomes an important coordinate to determine the priority and direction of national policies in welfare state that guarantees the high quality of life for its people¹. So far, South Korea's health statistics have promoted and achieved quantitative and qualitative improvement. Nonetheless, there is a still long way to cope up with the level of statistics of those advanced countries^{2,3}. Of those, the statistics on the death and cause of death are the very important data for establishing national policies on population, residential housing, social welfare and health by identifying the population size, population structure and death cause of Korean people⁴. It is required for hospitals and relevant agencies to make a lot of efforts and provide assistances in order to obtain objective data on the following issues:

"What percentage of people die on a yearly basis?", "What is the leading cause for death?" and "What is the age of death?"⁵ According to the data published by the National Statistics Office, the number of people who died in 2013 was 266,257 people. It was slightly lower than the number of people who died in 2012 (267,221 people). Nonetheless, the number of people who died is on the rise based on the data of the past 5 years⁶. Since this data from the death registration is collected from the entire population, it can become an index for health level⁷. Also, it allows us to observe the changes in the prevalent type of disease over time. In addition, it can provide a hypothesis of epidemiological studies through comparison with the other countries and the analysis itself as to the data can become a subject of epidemiological studies^{8,9}. Currently, South Korea is producing the statistical data on the level of death through the generalization of death registration system. However, it is still difficult to obtain accurate statistical data on the death rate for each death cause and

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the relevance of death rate and main diagnoses with hospitalization type¹⁰. Therefore, the purpose of this study is to provide preliminary data as to the relevance of main diagnoses and death rate with age and cause of death and hospitalization type in South Korea through analyzing the 707 died patients who had visited the university hospital from January 1 to December 31 2013. Thus, the specific objectives of this study are as follows.

First, this study aims to identify the characteristics of died patients by analyzing the general characteristics of study subjects. Second, this study aims to examine the hospitalization type of died patients by analyzing the characteristics of hospitalization type. Third, this study aims to examine which diagnosis result accounted for the highest proportion for death by analyzing the main diagnoses of died patients. Fourth, this study aims to examine the correlation between the items by conducting correlation analysis on each item as to the hospitalization type.

2. Method of Study

2.1 Study Subjects and Study Period

This study selected the 707 died patients out of those patients who had visited the university hospital from January 1 to December 31 2013.

2.2 Method of Study

In regard to the general characteristics, this study leveraged the following four items: gender, age, residence and insurance type. As for the hospitalization type, this study leveraged the following eight items: hospitalization office, discharge office, course of hospitalization, course of visit, treatment result, surgical history, number of hospitalization and hospitalization period. Lastly, this study leveraged the top 15 diagnoses as the only item for the main diagnoses related characteristics. The code of main diagnoses in this study was named with three-digit string (1 place of alphabet and 2 integers).

2.2 Analytical Method

As for the method of analytical, this study conducted t-test and correlation statistics for the correlation on general characteristics, hospitalization type, main diagnoses related characteristics and hospitalization related characteristics. This study utilized SPSS18.0 for the processing

and analysis of all data used in this study.

3. Results of Study

3.1 General Characteristics of Study Subjects

From the general characteristics of died patients, the men accounted for 59.5%, whereas the women accounted for 40.5%. For both the men and women, those aged between 61 years old and 80 years old accounted for the highest proportion with 34.5% and 18.8%, respectively. In the case of the men, those aged between 41 years old and 60 years old accounted for the second highest proportion with 13.6%, followed by those aged 81 years old or older with 10.4%. In the case of the women, those aged 81 years old or older accounted for the second highest proportion with 10.4%, followed by those aged between 41 years old and 60 years old with 7%. As for the number of hospitalization, 1 to 3 times accounted for the highest proportion with 62.4% for both the men and women, followed by 4 to 6 times with 16.8% and 7 to 10 times with 10.2%. It was found that the number of patients who had hospitalized more than 10 times was gradually decreasing. As for the residence, Chungcheongnam-do accounted for the highest proportion with 46.4%, followed by Daejeon Metropolitan City with 39.1% and Chungcheongbuk-do (3.3%). The other regions accounted only for a small proportion. As for the insurance type, insurance accounted for the highest proportion with 86.0% (51.9% for the men and 34.1% for the women), followed by protection with 10.0%, self-insurance with 2.8%, occupational health and safety insurance with 0.4% and general insurance with 0.7% (Table 1).

3.2 Type of Hospitalization

As for the type of hospitalization of died patients, each item showed similar characteristics in relation to the gender. There was a significant difference between hospitalization office and discharge office at the significance level of 0.05. In the case of hospitalization office, the internal medicine accounted for 80.2%, In the case of discharge office, the internal medicine accounted for 82.1%. In both of hospitalization office and discharge office, the internal medicine accounted for a substantially higher percentage than the surgical department. As for the course of hospitalization, emergency room accounted for 69.4%.

As for the course of visit, direct visit accounted for the highest proportion with 69.2%. In addition, those who died after 48 hours after the treatment accounted for 79.9%, whereas those who died within 48 hours after the treatment accounted for 20.1%. As for the surgical history, those patients who did not undergo surgery accounted for 87.1%, whereas those patients who underwent surgery accounted for 12.9% (Table 2).

highest proportion with 6.5% out of a total of 707 people, followed by malignant neoplasm of liver and intrahepatic bile duct (C22) with 6.1%, pneumonia of unspecified pathogen (J18) with 5.7%, bacterial pneumonia that is not otherwise classified (J15) with 5.1%, malignant neoplasm of stomach (C16) and intracranial injury (S06) with 4.2 % respectively. There were the 6 diagnoses related to malignant neoplasm in the top 15 diagnoses representing high

Table 1. General characteristics of study subjects

	Men	Women	Unit: People (%) Total
Age			
Under 14	2(0.3)	1(0.1)	3(0.4)
15 – 29	3(0.4)	4(0.6)	7(1.0)
30 – 44	9(1.3)	8(1.1)	17(2.4)
45 – 59	87(12.4)	45(6.4)	132(18.8)
60 or older	318(45.4)	224(32.0)	542(77.3)
Residence			
Daejeon Metropolitan City	162(23.0)	114(16.2)	276(39.1)
Chungcheongnam-do	201(28.5)	126(17.9)	327(46.4)
Other	56(8.2)	44(6.2)	102(14.5)
Insurance Type			
Insurance	367(51.9)	241(34.1)	608(86.0)
Protection	38(5.4)	33(4.7)	71(10.0)
Self-Insurance	11(1.6)	9(1.3)	20(2.8)
Occupational Health and Safety	3(0.4)	0(0.0)	3(0.4)
General	2(0.3)	3(0.4)	5(0.7)
Total	421(100.0) (59.5)	286(100.0) (40.5)	707(100.0) (100.0)

3.3 Length of Hospitalization

As for the number of hospitalization, it was 4.74 times for the mean, whereas it was 4.80 times for the women. The mean value was 4.77 times. The average hospitalization period of died patients was 19.23 days for the men and 17.34 days for the women. Thus, the hospitalization period for the men was longer than the one of the women. The mean value was 18.47 days (Table 3).

3.4 Principal Diagnosis

As a result of analyzing the top 15 diagnoses of died patients, a total of 363 people died of one of the 15 diagnoses out of a total of 707 people. They accounted for 51.3%. In addition, there was a significant difference in the main diagnoses depending on the gender at the significance level of 0.05. As for the main diagnoses of died patients, those patients diagnosed with malignant neoplasm of bronchus and lung (C34) accounted for the

high frequency; thus, it was possible to know that the diagnoses related to malignant neoplasm had become one of the major causes of death. As for the gender ratio in a majority of major diagnoses, the men and women had a similar value. However, the women accounted for a higher % with 1.4% than the men in subarachnoid hemorrhage (I60) (Table 4).

3.5 Correlation on Type of Hospitalization of Dead Patients

As a result of conducting the correlation analysis on treatment result, surgical history, hospitalization period, discharge office and hospitalization office as to the type of hospitalization of died patients, this study found a high degree of correlation ($r=0.618$) between treatment result (death within 48 hours and death after 48 hours) and hospitalization period at the significance level of 0.01. There was a moderate level of correlation ($r=-0.466$) between hospitalization and surgical history. Also, there was

Table 2. Type of hospitalization

Type of Hospitalization	Men (N=421)	Women (N=286)	Total (N=707)	X ² -test	p-value
Hospitalization Office				6.606	0.010*
Internal Medicine	351(49.6)	216(30.6)	567(80.2)		
Surgical Department	70(9.9)	70(9.9)	140(19.8)		
Discharge Office				5.012	0.025*
Internal Medicine	356(50.6)	222(31.5)	578(82.1)		
Surgical Department	64(9.1)	62(8.8)	126(17.9)		
Course of Hospitalization				2.839	0.242
ER	293(41.4)	198(28.0)	491(69.4)		
OPD	126(17.8)	83(11.7)	209(29.6)		
Infant Room	2(0.3)	5(0.7)	7(0.1)		
Course of Visiting Hospital				0.451	0.798
Direct Visit	295(41.7)	194(27.4)	489(69.2)		
Directed from Other Hospital	125(17.7)	91(12.9)	216(30.6)		
Family Medicine	1(0.1)	1(0.1)	2(0.3)		
Treatment Result				0.011	0.915
Died within 48 hours	84(11.9)	58(8.2)	142(20.1)		
Died after 48 hours	337(47.7)	228(32.2)	565(79.9)		
Surgical History				0.761	0.383
Yes	58(8.2)	33(4.7)	91(12.9)		
No	363(51.3)	253(35.8)	616(87.1)		
Total	421(100.0) (59.5)	286(100.0) (40.5)	707(100.0) (100.0)		

*p<0.05

Table 3. Length of hospitalization

	Men	Women	Mean	p-value
Number of Hospitalization	4.74±0.30	4.80±0.47	4.77±0.26	0.910
Days of Hospitalization	19.23±1.27	17.34±1.45	18.47±0.96	0.329

a moderate level of correlation ($r=-0.498$) between discharge and surgical history. In conclusion, it was found that there was a high degree of correlation ($r=0.792$) between hospitalization and discharge (Table 5).

4. Conclusion and Consideration

The purpose of this study is to help establish health-related policies by analyzing the 707 died patients out of those patients who had visited the university hospital from January 1 to December 31 2013. The summary of the results of this study is as follows.

In regard to the general characteristics of study subjects, the percentage of men was higher than the percentage of women. In addition, those aged 60 years old or older accounted for 77.3%. As for the residence, Chungcheongnam-do accounted for 46.4%. As for the insurance type, insurance accounted for the highest proportion with 86.0. As for the hospitalization-related characteristics in accordance with gender, the percentage of internal medicine was 80.2%. The percentage of internal medicine was high for both men and women. The internal medicine also accounted for 82.1% in the case of the discharge office. Also, both hospitalization and discharge were found to have a significant difference ($p<0.05$).

Table 4. Principal diagnosis

Principal Diagnosis	Men (N=421)	Women (N=286)	Total (N=707)	X ² -test	Unit :People (%) p-value
Principal Diagnosis				214.685	0.002*
Malignant Neoplasm of Bronchus and Lung (C34)	29(4.1)	17(2.4)	46(6.5)		
Malignant Neoplasms of Liver and Intrahepatic Bile Duct (C22)	32(4.5)	11(1.6)	43(6.1)		
Unspecified Pneumonia Pathogen (J18)	23(3.3)	17(2.4)	40(5.7)		
Bacterial pneumonia that are not classified otherwise (J15)	29(4.1)	7(1.0)	36(5.1)		
Malignant Neoplasm of Stomach (C16)	16(2.3)	14(2.0)	30(4.2)		
Intracranial Injury (S06)	21(3.0)	9(1.3)	30(4.2)		
Malignant Neoplasm of Pancreas (C25)	11(1.3)	9(1.3)	20(2.8)		
Intracerebral Hemorrhage (I61)	9(1.3)	9(1.3)	18(2.5)		
Poison Effect of Pesticides (T60)	11(1.6)	6(0.8)	17(2.4)		
Malignant Neoplasms of Rectum (C20)	13(1.8)	3(0.4)	16(2.3)		
Subarachnoid Hemorrhage (I60)	6(0.6)	10(1.4)	16(2.3)		
Pneumonia Caused by Solid and Liquid (J69)	8(1.1)	7(1.0)	15(2.1)		
Other and Malignant Neoplasm of Unspecified Parts of Biliary Tract (C24)	8(1.1)	4(0.6)	12(1.7)		
Angina Pectoris with a Spasm of Substrate (I21)	10(1.4)	2(0.3)	12(1.7)		
Cerebral Infarction (I63)	6(0.8)	6(0.8)	12(1.7)		
Total	421(100.0) (59.5)	286(100.0) (40.5)	707(100.0) (100.0)		

*p<0.05

Table 5. Correlation on type of hospitalization of dead patients

	Treatment Result	Surgical History	Days of Hospitalization	Number of Hospitalization	Discharge Office	Hospitalization Office
Treatment Result	1					
Surgical History	-0.119**	1				
Days of Hospitalization	0.618**	-0.148**	1			
Number of Hospitalization	0.105**	0.093*	0.123**	1		
Discharge Office	0.002	-0.498**	-0.077*	-0.134**	1	
Hospitalization Office	0.001	-0.466**	-0.061	-0.159**	0.792**	1

*p<0.05 **p<0.01

As for the course of hospitalization, emergency room accounted for 69.4%, whereas direct visit accounted for 69.2%. As for the treatment result of died patients, those who died after 48 hours accounted for 79.9%, whereas those who did not undergo surgery accounted for 87.1%. As for the mean value for number of hospitalization and hospitalization period, the mean value for the number

of hospitalization was 4.77 times. Both men and women showed a similar value. However, the mean value for the hospitalization period was 18.47 days, where it was 19.23 days for the men and 17.34 days for the women. The mean value for the hospitalization period of the men was higher than the one of the women. As a result of examining the top 15 diagnoses, malignant neoplasm of bronchus

and lung accounted for the highest proportion, followed by malignant neoplasm of liver and intrahepatic bile duct, pneumonia of unspecified pathogen, bacterial pneumonia that is not otherwise classified, malignant neoplasm of stomach and intracranial injury. As for the correlation on hospitalization related characteristics, there was a high degree of correlation between hospitalization and discharge. Also, there was a high degree of correlation between hospitalization period and treatment result. Moreover, it was found that there was a moderate level of correlation between discharge and surgical history and also between hospitalization and surgical history.

This study leveraged the data only from the death statistics of one university hospital. Thus, this study can hardly be deemed as a representative result of South Korea on died patients. Nonetheless, it is believed that it will be possible to manage hospitals and establish national health policies more efficiently by leveraging the above-stated statistical analysis data on died patients.

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