

Does hospice service associated with efficient healthcare costs among terminal lung cancer patients ?

Hospital charges per day of lung cancer patients at their end of life; A retrospective cohort design of 2010-2018

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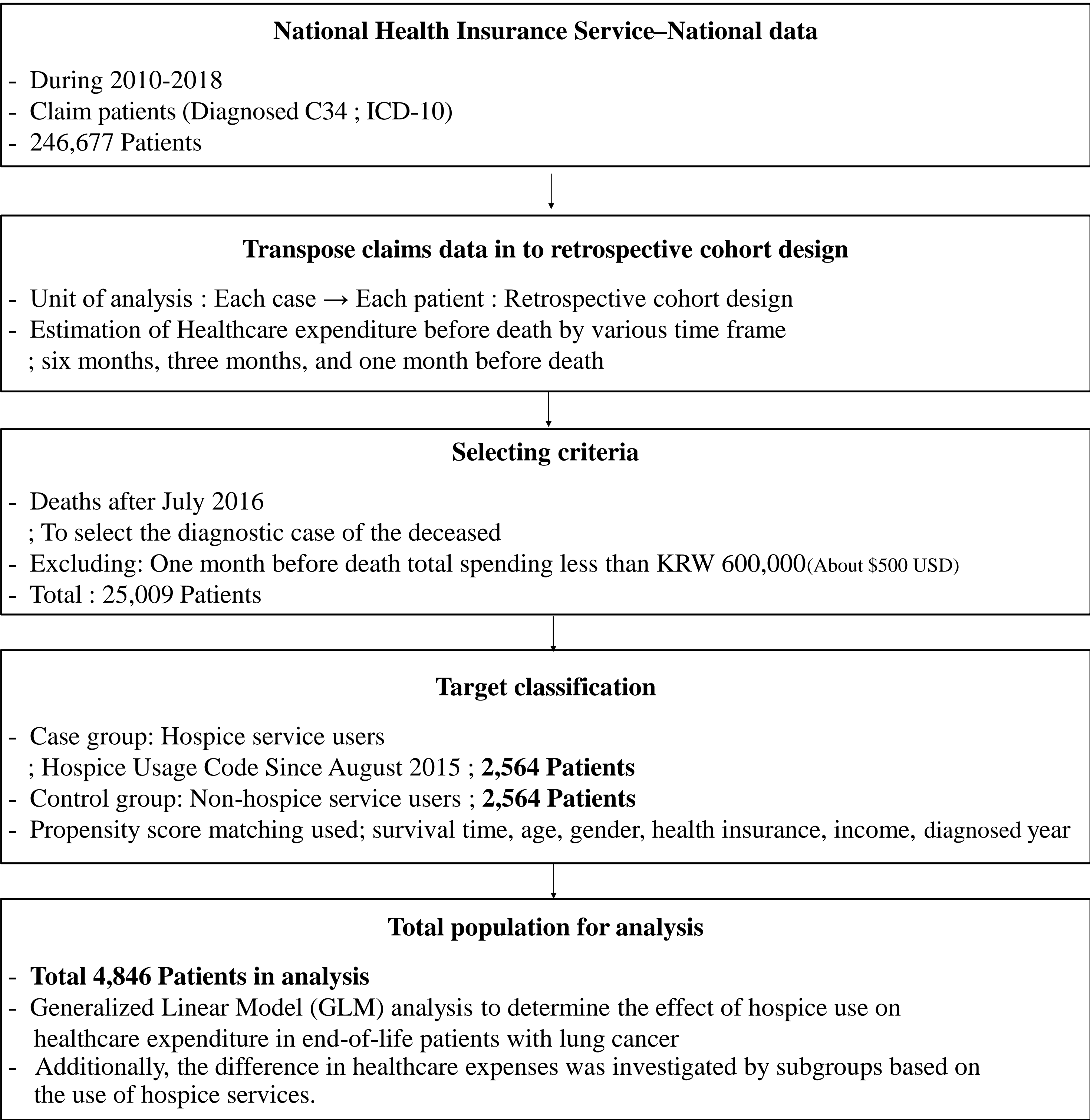
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Introduction

- Hospice palliative care is medical care aimed at improving the quality of life for terminal cancer patients and their families through comprehensive assessment and treatment of the physical, psychosocial and spiritual areas, including relief of pain and symptoms.
- The healthcare costs of cancer patients were markedly increased to show a "U" shape at the first stage of diagnosis and at the end of life. Especially during the last months of life, hospital charges are known to increase rapidly
- Over the past decades, cancer is the one leading cause of death in Korea, the latest statistics indicate that in 2017, there were **26,985 incident** lung cancer cases (out of a total of 232,255 cancer cases; **53% male**), **18,574 deaths** (out of a total of 81,203 deaths; **62% male**) in Korea
- The share of hospice use among all cancer deaths was 17.5% in 2016 and 20.0% in 2017, up from 7.3% in 2008. However, in 2011, the figure far behind the United States (52.0%), the United Kingdom (46.6%), Canada (40.8%) and Taiwan (39.0%), etc.
- From July 2015, South Korea started applying national health insurance reimbursement to inpatient hospice services, and it is now appropriate time to evaluate how hospice care associated with healthcare costs using national health insurance claims data among terminal lung cancer patients.
- The purpose of this study was to investigate how the hospice program for lung patients were associated with end of life healthcare expenditure of lung cancer patients using Korean Nationwide Health Insurance(NHI) Claims.

Methods

- We used nationwide **newly diagnosed lung cancer patients**’ health insurance claims during 2010-2018 which accounted for **246,677 patients**. We transposed the dataset into a retrospective cohort design study that the unit of analysis is information of each lung cancer patient.
- Then hospital charges and utilization were estimated for each patient according to six months, three months, and one month before death.
- We selected study population as **death after July 2016** and we have observed hospice service users’ healthcare expenditure before death by different time frame comparing with non-hospice service users. A control group(non-service users) was selected based on the propensity score matching using survival time, age, gender, health insurance, income and diagnosed year.
- Finally, Generalized Linear Model (GLM) analysis to determine the effect of hospice use on healthcare expenditure in end-of-life patients with lung cancer. Additionally, the difference in healthcare expenses was investigated by subgroups based on the use of hospice services.



Flow Chart of Subject Selection

Results

- The total study subjects were 5,128 patients(male:4,286(83.6%), female:842(16,4%)). The average survival time of hospice service users was 235 days, and the average survival time of non-hospice service users was 235 days.
- Hospice service users were associated with lower hospital charges per day as they close to death than non-hospice service users.

Variables	Total(n=8,414)	Hospice service users(N=4,207)		Non-hospice service users(N=4,207)	
	means	means	STD	means	STD
Survival time (day)	235	235	236	235	236
Total spending (KRW)	20,806,144	19,490,230	17,033,106	22,122,059	17,367,880
Length of stay (day)	78.0	75.3	71.1	80.0	68.2
Daily healthcare expenditure(KRW)					
One month before death	<b>270,627</b>	<b>279,575</b>	254,784	<b>261,678</b>	125,603
Three month before death	249,668	254,339	197,436	244,998	142,100
Six month before death	251,440	253,679	183,731	249,202	149,676

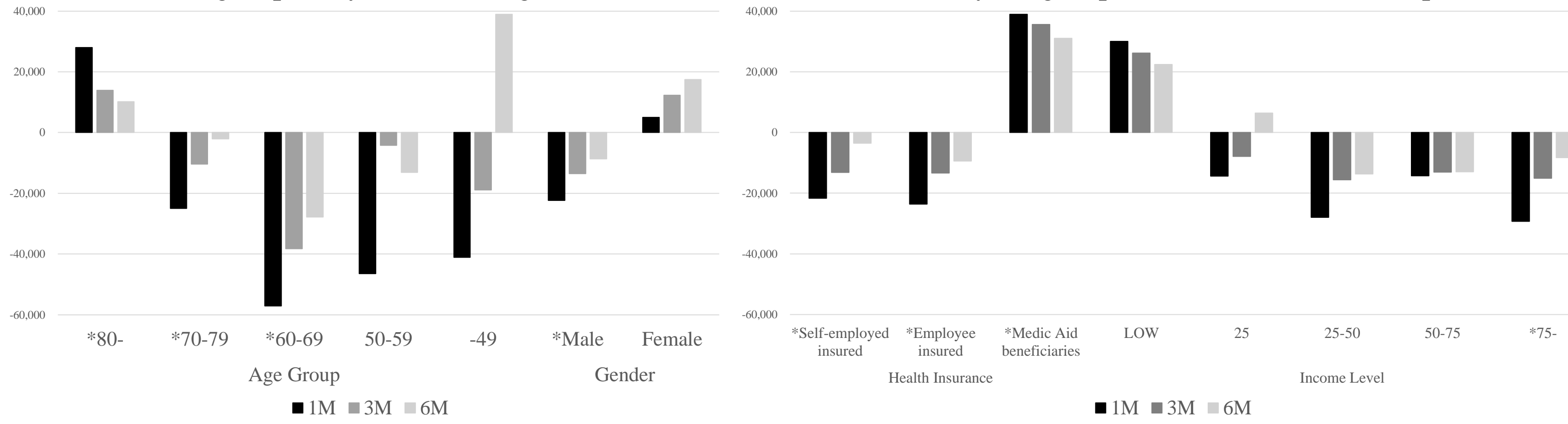
- With other variables were adjusted, hospice users spent less on hospital charges per day by lung cancer patients at their end of life compared to non-users 18,178 KRW (about \$16) for 1 months before death, 9,577 KRW(about \$8) for 3 months before death..

The result of GLM analysis to confirm the impact of hospice on healthcare costs in end-of-life lung cancer patients

Variables		One month before death spending	<i>p</i> -value	Three month before death spending	<i>p</i> -value	Six month before death spending	<i>p</i> -value
Hospice Service							
	Non-User	ref		ref		ref	
	User	-18,178	0.00	-9,577	0.04	-4,732	0.30
Age Group							
	80-	ref		ref		ref	
	70-79	32,581	<.0001	30,706	<.0001	33,992	<.0001
	60-69	64,879	<.0001	54,407	<.0001	56,818	<.0001
	50-59	86,492	<.0001	94,790	<.0001	84,199	<.0001
	-49	87,369	0.00	84,213	0.00	76,009	0.00
Gender							
	Female	ref		ref		ref	
	Male	22,619	0.00	19,275	0.00	13,400	0.04
Health Insurance							
	Medic Aid beneficiaries	ref		ref		ref	
	Self-employed insured	17,212	0.50	24,767	0.26	31,141	0.15
	Employee insured	20,219	0.42	25,582	0.23	32,859	0.11
Income Level							
	Lowest income group	ref		ref		ref	
	Under 25%ile	-5,379	0.82	-5,072	0.80	-11,698	0.56
	25%ile – 50%ile	-1,198	0.96	-3,406	0.87	-5,417	0.79
	50%ile – 75%ile	-8,805	0.71	-9,707	0.63	-17,565	0.38
	75%ile over	-4,528	0.85	-8,200	0.68	-14,298	0.47
Diagnosed year							
	2014	ref		ref		ref	
	2015	-11,487	0.63	-4,007	0.85	21,118	0.29
	2016	9,622	0.70	-665	0.98	15,805	0.45
	2017	29,505	0.26	29,481	0.18	46,727	0.03
	2018	63,641	0.02	57,447	0.01	74,933	0.00
Survival Time [day]*		-3.7	0.84	-36.0	0.02	-27.3	0.07

- For hospice service users for lung cancer patients at their end of life, daily medical expenses decreased among those aged 60 to 79, and the employees who were insured and 75%ile or more income groups (1 month; age of 60-69: -57,033 KRW, 70-79: -24,965 KRW, employee insured: -23,655 KRW, self-employed insured: -21,700 KRW, 75%ile - :-29,332 KRW, ref: non hospice user).
- On the other hand, daily medical expenses increased for patients over 80 years of age and medic aid beneficiaries (1 month; age of 80 over: 27,992 KRW, medic aid beneficiaries: 38,970 KRW).

The result of subgroup analysis to investigate differences in healthcare costs by subgroups based on the use of hospice services



\*Statistically significant disparity was shown(based on one month before death spending), all adjusted by age group, sex, health insurance, income level, diagnosed year and survival time.

Conclusions

- In this study, we found lower end-of-life healthcare associated hospital charges were found for the lung cancer inpatients who were admitted to hospitals with hospice care beds when nears death. Furthermore, the savings in the expenses for hospice services differed according to the individual's socioeconomic level.
- Through the reduction of healthcare expenditure of end-of-life patients with lung cancer, it is possible to improve the efficiency of national healthcare expenditure in Korea, which has entered the aged society.
- This study suggests that health policy-makers and the National Health Insurance program need to consider expanding the use of hospice care beds within hospitals and hospice care facilities for end-of-life patients with lung cancer in South Korea, where very limited numbers of resources are currently available.