

# Trends of Do-Not-Resuscitate consent and hospice care utilization among noncancer decedents in a tertiary hospital in Taiwan between 2010 and 2014

## A Hospital-based observational study

Hsiao-Ting Chang, MD, MS, PhD<sup>a,b</sup>, Ming-Hwai Lin, MD, MS<sup>a,c</sup>, Chun-Ku Chen, MD, MHA<sup>d,e</sup>, Pesus Chou, Dr. PH<sup>f</sup>, Tzeng-Ji Chen, MD, Dr. med<sup>a,g,\*</sup>, Shinn-Jang Hwang, MD<sup>a,h</sup>

### Abstract

Do-Not-Resuscitate (DNR) and hospice care are not only applied to cancer patients but also to patients with noncancer progressive illness. However, the trends of DNR consent and hospice utilization are not well explored for noncancer patients. This study aimed to explore the trends of DNR consent and hospice care utilization among noncancer decedents in a tertiary hospital in Taiwan. We analyzed the Death and Hospice Palliative Care Database from the Taipei Veterans General Hospital in Taiwan. The Death and Hospice Palliative Care Database contains information including patient sex, major diagnosis, admission date, date of death, age at death, department at discharge, status of DNR consent, and status of hospice care of patients who died in the Taipei Veterans General Hospital. Data on patients aged 20 years old or more who died of major terminal noncancer diseases, including brain diseases, amyotrophic lateral sclerosis, dementia, chronic obstructive pulmonary disease (COPD) and other lung diseases, heart failure, chronic liver diseases and cirrhosis, and renal failure between 2010 and 2014 were extracted for analysis. A total of 1416 patients aged 20 years or more died of major noncancer diseases in Taipei Veterans General Hospital during the study period. The most common diagnosis was brain diseases, amyotrophic lateral sclerosis, and dementias (n=510, 36%) followed by chronic obstructive pulmonary disease and other lung diseases (n=322, 22.7%). Among these noncancer decedents, 1045 (73.8%) had DNR consents, while 134 (9.5%) received hospice care. Patients diagnosed with renal failure had the highest percentage of DNR consent (80%), followed by chronic liver diseases and cirrhosis (77.7%). Patients diagnosed with chronic liver diseases and cirrhosis had the highest percentage of hospice utilization (17.4%), followed by renal failure (15.8%). The percentages of DNR consent and hospice utilization were significantly different across different disease diagnosis, hospitalization department, and year of death. There were increased trends of DNR consent in patients with major noncancer diagnoses, and increased hospice care utilization in patients diagnosed with lung diseases and renal failure from 2010 to 2014. However, the hospice care utilization could be improved. Further study to evaluate factors associated hospice care to improve the utilization is suggested.

**Abbreviations:** ALS = amyotrophic lateral sclerosis, COPD = chronic obstructive pulmonary disease, DNR = Do-Not-Resuscitate.

**Keywords:** Do-Not-Resuscitate, hospice care utilization, noncancer diseases

Editor: Ching-Sheng Hsu.

There was no funding support for this study.

The authors have no conflicts of interest to declare.

<sup>a</sup> Department of Family Medicine, Taipei Veterans General Hospital, <sup>b</sup> School of Medicine and Institute of Public Health and Community Medicine Research Center, National Yang-Ming University, <sup>c</sup> School of Medicine, and Institute of Public Health, National Yang-Ming University, <sup>d</sup> Department of Radiology, Taipei Veterans General Hospital, <sup>e</sup> Institute of Clinical Medicine, National Yang-Ming University, <sup>f</sup> Institute of Public Health and Community Medicine Research Center, National Yang-Ming University, <sup>g</sup> School of Medicine and Institute of Hospital and Health Care Administration, National Yang-Ming University, <sup>h</sup> School of Medicine, National Yang-Ming University, Taipei, Taiwan, Republic of China.

\* Correspondence: Tzeng-Ji Chen, Chief of the Department of Family Medicine, Taipei Veterans General Hospital, Taipei, Taiwan and Professor of the School of Medicine and Institute of Hospital and Health Care Administration, National Yang-Ming University, Taipei, Taiwan, No. 201, Sec. 2, Shipai Rd., Beitou Dist., Taipei City 11217, Taiwan (e-mail: tjchen@vghtpe.gov.tw).

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Medicine (2016) 95:46(e5394)

Received: 3 October 2015 / Received in final form: 21 October 2016 / Accepted: 22 October 2016

<http://dx.doi.org/10.1097/MD.0000000000005394>

## 1. Introduction

Do-Not-Resuscitate (DNR) states that cardiopulmonary resuscitation will not be performed on patients in the terminal stage of incurable diseases, in order to allow them a peaceful death.<sup>[1]</sup> Hospice palliative care is an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness through the prevention and relief of suffering by assessment and treatment of pain, physical, psychosocial, and spiritual problems.<sup>[2]</sup>

To respect terminally ill patients' wishes on their medical treatment and protect their rights, the Taiwan government legislated the Hospice Palliative Care Act in 2000, then amendments to the act in 2002, 2012, and 2013. Originally, the act included only cancer patients and their rights to choose DNR and hospice palliative care once they are terminally ill. After legislation amendments, the act was expanded to also include noncancer patients' rights to choose DNR and hospice palliative care. Once 2 disease-specific specialists diagnose that a patient is in a terminal stage of the disease, the physicians will discuss the patient's wishes regarding DNR with the patient or his/her family. According to the Hospice Palliative Care Act, if the patient is competent, he/she can sign the DNR consent by himself or herself, but if not, his or her family can sign it on the patient's behalf.<sup>[3]</sup> According to the regulation of the National Health Insurance, patients in the terminal stage of brain diseases, amyotrophic lateral sclerosis (ALS), dementia, heart, lung, liver, and renal diseases are eligible for hospice care in Taiwan. In Taiwan, hospice care is provided in 3 ways. First, hospice home care to patients in the community; second, hospice inpatient care for patients admitted in the hospice ward in hospital; third, hospice shared care for patients admitted in hospital wards other than hospice wards. Hospice inpatient care is provided for terminal ill patients suffered from refractory physical, psychosocial, spiritual symptoms, or for end-of-life care. However, because of culture issues<sup>[4–5]</sup> and limited inpatient hospice care beds in hospital, these patients might get admitted in general acute wards for symptoms control and end-of-life care.

There are several studies aimed at DNR consent status of noncancer patients. A previous study evaluated palliative decision-making in patients diagnosed with dementia, end-stage congestive heart failure, and end-stage chronic obstructive pulmonary diseases who died in an acute care hospital in Spain, and found 37% patients had DNR orders and 65% of these patients received palliative care.<sup>[6]</sup> Another study in Japan revealed that compared with thoracic cancer patients, noncancer respiratory disease patients were less likely to have a DNR order earlier than cancer patients.<sup>[11]</sup> A study investigating the DNR condition in a surgical intensive care unit in a tertiary hospital in Taiwan revealed that the 65.5% to 72.8% deceased patients had a DNR consent, and the majority of these patients were under care of the general surgery section.<sup>[7]</sup>

However, in clinical practice we find that death and death-related issues are taboo subjects for some people in oriental culture, and people may misinterpret hospice palliative care mean no treatment or giving up all treatments. The hospice palliative care workers in Taiwan work hard to help people understand the meanings of DNR and hospice palliative care to improve the quality of death and life, respectively. To the best of our knowledge, few studies have focused on DNR or hospice care utilization in noncancer patients. Therefore, the aims of this study were to explore the characteristics of patients dying of major noncancer diseases, and the differences and trends of

DNR consent and hospice care utilization of terminal noncancer patients in a tertiary hospital in Taiwan between 2010 and 2014.

## 2. Methods

### 2.1. Data source

This study was a cross-sectional study conducted by using the Death and Hospice Palliative Care Database from the Taipei Veterans General Hospital in Taiwan. The Taipei Veterans General Hospital is a tertiary hospital providing 2941 beds for acute care with a hospice palliative care team including physicians, nurses, clinical psychotherapist, social worker, spiritual therapist, and art therapist. The Death and Hospice Palliative Care Database contains information including patient sex, major diagnosis, date of last admission, date of death, age at death, department at discharge, status of DNR consent, and status of hospice care utilization of patients who died in the Taipei Veterans General Hospital. Data of patients aged 20 years old or more and who died of major terminal noncancer diseases, including brain diseases, ALS, dementia, lung diseases, heart failure, chronic liver diseases and cirrhosis, and renal failure between 2010 and 2014 were extracted for analysis. We examined the characteristics of the patients including age, sex distribution, diagnoses, and admission departments by different years. Then, we further analyzed DNR and hospice care utilization by patient diagnosis, admission department, and year.

The review board of Taipei Veterans General Hospital in Taiwan approved this study and deemed informed consent unnecessary owing to its retrospective nature.

### 2.2. Statistical analysis

Statistical analyses were performed by IBM SPSS version 20.0 (IBM Corporation, Armonk, NY). For descriptive statistics, the continuous variable of age was analyzed by Student *t* tests and length of stay was analyzed by Mann–Whitney *U* test. Categorical variables, including diagnosis distributions, admission department distributions, and sex distribution were analyzed by chi-square tests. Trend analyses were analyzed by using nonparametric Jonckheere–Terpstra test. A 2-tailed *P* value < 0.05 was considered statistically significant.

## 3. Results

### 3.1. Patient characteristics

Characteristics of patients who died of major noncancer diseases during 2010 to 2014 are described in Table 1. Between January 1, 2010 and December 31, 2014, a total of 1416 patients aged 20 years or more died of major noncancer diseases in Taipei Veterans General Hospital. Specifically, the numbers of patients were 510 (36.0%) for brain diseases, ALS, and dementias; 322 (22.7%) for COPD and other lung diseases; 240 (16.9%) for heart failure; 224 (15.8%) for chronic liver diseases and cirrhosis, and 120 (8.5%) for renal failure. The disease distributions were not significantly different across different years ( $P=0.481$ ). Patient number distributions for each year were 253 (17.8%) in 2010, 299 (21.2%) in 2011, 281 (19.8%) in 2012, 272 (19.6%) in 2013, and 306 (21.7%) in 2014, respectively. The mean age at death was  $76.1 \pm 14.7$  years. Most of these patients were admitted to the department of internal medicine ( $n=773$ , 54.6%), followed by the departments of neurology ( $n=301$ ,

**Table 1**  
**Characteristics of patients dying from major noncancer diseases during 2010 to 2014.**

Characteristics	Total		2010		2011		2012		2013		2014		P
	n	%	n	%	n	%	n	%	n	%	n	%	
Gender													
Men	940	66.4	171	67.6	202	67.6	186	66.2	179	64.6	202	66.0	0.94
Women	476	33.6	82	32.4	97	32.4	95	33.8	98	35.4	104	34.0	
Diagnosis													0.48
Brain diseases, ALS and dementia	510	36.0	85	33.6	108	36.1	95	33.8	113	40.8	109	35.6	
COPD and other lung diseases	322	22.7	60	23.7	80	26.8	67	23.8	56	20.2	59	19.3	
Heart failure	240	16.9	47	18.6	38	12.7	51	18.1	45	16.2	59	19.3	
Liver failure	224	15.8	42	16.6	42	14.0	44	15.7	44	15.9	52	17.0	
Renal failure	120	8.5	19	7.5	31	10.4	24	8.5	19	6.9	27	8.8	
Department of last hospitalization													0.14
Internal medicine	773	54.6	154	60.9	171	57.2	147	52.3	154	55.6	147	48.0	
Neurology	301	21.3	51	20.2	55	18.4	64	22.8	61	22.0	70	12.9	
Surgery	196	13.8	32	12.6	45	15.1	39	13.9	35	12.6	45	14.7	
Others	146	10.3	16	6.3	28	9.4	32	11	27	9.7	44	14.4	
Length of stay in day (median, range)	14	1-868	18	1-868	14	1-253	13	1-243	12	1-110	15	1-182	0.03

ALS=amyotrophic lateral sclerosis, COPD=chronic obstructive pulmonary disease.

21.3%), surgery (n=196, 13.8%), and other departments (n=146, 10.3%), including emergency (n=91, 6.4%), intensive care (n=20, 1.4%), hospice palliative care (n=17, 1.2%), orthopedics (n=5, 0.4%), gynecology (n=2, 0.1%), psychiatry (n=4, 0.3%), pediatrics (n=2, 0.1%), otolaryngology (n=2, 0.1%), radiology (n=2, 0.1%), and dentistry (n=1, 0.1%). The median of length of stay was 14 days.

**3.2. Do-Not-Resuscitate consent and hospice care utilization by gender**

Of the 1416 patients, 1045 (73.8%) signed a DNR consent while 134 (9.5%) received hospice palliative care. Female patients were more likely to sign DNR than male patients (77.3% vs 72.0%, P=0.04). More female patients received hospice care than male patients but this was not statistically different (10.1% vs 9.1%, P=0.56) (Table 2).

**3.3. Do-Not-Resuscitate consent and hospice care utilization by diagnosis, discharge department, and discharge year**

Table 3 described the DNR consent and hospice utilization of patients by diagnosis, discharge department and discharge year. The percentage of patients had DNR consents across disease diagnoses were significantly different (P=0.002). Patients diagnosed with renal failure had the highest percentage of DNR (80%), followed by chronic liver diseases and cirrhosis (77.7%), brain diseases, ALS and dementia (75.5%), COPD and

other lung diseases (73.6%), and heart failure (63.7%). For hospice care utilization, patients diagnosed with chronic liver diseases and cirrhosis had the highest rate of utilization (17.4%), followed by renal failure (15.8%), COPD and other lung diseases (10.9%), heart failure (7.5%), and brain diseases, ALS, and dementia (4.5%) (P<0.001). The percentage of DNR consent by hospitalization department was significantly different (P<0.001). Patients admitted to the department of neurology had the highest percentage of DNR consent (84.1%), followed by internal medicine (76.2%), other departments (65.1%), and department of surgery (55.1%). For hospice care utilization, patients admitted in the category of other department had the highest utilization (15.8%), followed by the department of internal medicine (11.6%), neurology (4.3%), and surgery (4.1%) (P<0.001). The percentage of DNR consent and hospice care utilization by discharge years showed significantly increased trends (both P<0.001).

**3.4. Trends of Do-Not-Resuscitate and hospice care utilization by diagnosis**

For DNR consent, there were significantly increased trends for brain diseases, ALS and dementia, COPD and other lung diseases, heart failure, chronic liver diseases and cirrhosis, and renal failure from 2010 to 2014. However, for hospice care utilization, patients diagnosed with COPD and other lung diseases, and renal failure, had significantly increased trends of utilization from 2010 to 2014 (P value for trends=0.007 and 0.001, respectively) (Table 4).

**Table 2**  
**DNR consent and hospice utilization of patients dying from major noncancer diseases during 2010 to 2014 by gender.**

Gender	DNR				P	Hospice utilization				P
	No		Yes			No		Yes		
	n	(%)	n	(%)		n	(%)	n	(%)	
Men	263	28.0	677	72.0	0.04	854	90.9	86	9.1	0.57
Women	108	22.7	368	77.3		428	89.9	48	10.1	

DNR=Do-Not-Resuscitate.

**Table 3****DNR consent and hospice utilization of patients dying from major noncancer diseases by diagnosis, discharge department, and discharge year.**

Characteristics	DNR				P	Hospice Utilization				P
	No		Yes			No		Yes		
	n	(%)	n	(%)		n	(%)	n	(%)	
Diagnosis					0.002					<0.001
Brain diseases, ALS and dementia	125	24.5	385	75.5		487	95.5	23	4.5	
COPD and other lung diseases	85	26.4	237	73.6		287	89.1	35	10.9	
Heart failure	87	36.2	153	63.7		222	92.5	18	7.5	
Liver failure	50	22.3	174	77.7		185	82.6	39	17.4	
Renal failure	24	20.0	96	80.0		101	84.2	19	15.8	
Department of last hospitalization					<0.001					<0.001
Internal medicine	184	23.8	589	76.2		683	88.4	90	11.6	
Neurology	48	15.9	253	84.1		283	95.7	13	4.3	
Surgery	88	44.9	108	55.1		188	95.9	8	4.1	
Others	51	34.9	95	65.1		123	84.2	23	15.8	
Discharge year					<0.001					<0.001
2010	114	45.1	139	54.9		243	96.0	10	4.0	
2011	83	27.8	216	72.2		274	91.6	25	8.4	
2012	62	22.1	219	78.9		256	91.1	25	8.9	
2013	55	19.7	222	80.1		250	90.3	27	9.7	
2014	57	19.2	249	81.4		259	84.6	47	15.4	

ALS=amyotrophic lateral sclerosis, COPD=chronic obstructive pulmonary disease, DNR=Do-Not-Resuscitate.

**Table 4****Trends of DNR and hospice utilization of patients dying from major noncancer diseases by year.**

DNR statement by disease diagnosis	2010		2011		2012		2013		2014		P for trend
	n	%	n	%	n	%	n	%	n	%	
Brain diseases, ALS and dementia											0.001
Yes	55	64.7	77	71.3	75	78.9	89	78.8	89	81.7	
No	30	35.3	31	28.7	20	21.1	24	21.2	20	18.3	
COPD and other lung diseases											0.001
Yes	31	51.7	61	76.2	54	80.6	46	82.1	45	76.3	
No	29	48.3	19	23.8	13	19.4	10	17.9	14	23.7	
Heart failure											<0.001
Yes	31	66	24	63.2	32	72.5	37	71.1	44	74.6	
No	16	34	14	46.8	14	27.5	13	28.9	15	25.4	
Liver failure											0.004
Yes	28	66.7	31	73.8	31	70.5	38	86.4	46	88.5	
No	14	33.3	11	27.2	13	29.5	6	13.6	6	11.5	
Renal failure											<0.001
Yes	9	47.4	23	74.2	22	91.7	17	89.5	25	92.6	
No	10	52.6	8	25.8	2	8.3	2	10.5	2	7.4	
Hospice utilization by disease diagnosis											
Brain diseases, ALS and dementia											0.23
Yes	3	3.5	5	4.6	2	2.1	5	4.4	8	7.3	
No	82	96.5	102	95.4	93	97.9	102	95.6	102	92.7	
COPD and other lung diseases											0.007
Yes	2	3.3	7	8.8	8	11.9	7	12.5	11	18.6	
No	58	96.7	73	91.2	59	88.1	49	87.5	48	81.4	
Heart failure											0.24
Yes	3	6.4	2	5.3	3	5.9	3	6.7	7	11.9	
No	44	93.6	36	94.7	48	94.1	42	93.3	52	88.1	
Liver failure											0.11
Yes	2	4.8	9	21.4	9	20.5	8	18.2	11	21.2	
No	40	95.2	33	78.6	35	79.5	36	81.8	41	78.8	
Renal failure											0.001
Yes	0	0	2	6.5	3	12.5	4	21.1	10	37.0	
No	10	100	29	93.5	21	87.5	15	78.9	17	63.0	

ALS=amyotrophic lateral sclerosis, COPD=chronic obstructive pulmonary disease, DNR=Do-Not-Resuscitate.

#### 4. Discussion

In this study, we have 3 major significant findings. First, there is a significant increased trend of overall DNR consent among noncancer decedents. Second, there is a significant increased trend of hospice utilization among noncancer decedents. Third, there are significantly increased trends of DNR consent for each disease during the study period, but increased trends of hospice utilization were only found in COPD and other lung diseases.

In this study, we found an increased trend of DNR consent during the study period from 2010 to 2014. However, the percentage of patients had DNR consents were lower than a previous study conducted by Vetsch et al<sup>[8]</sup> in a department of general internal medicine in an 1000-bed tertiary hospital in Switzerland. This difference might be related to the age and disease distributions of patients. In our study, patients were older and all were noncancer patients, while in Vetsch study 22% patients were diagnosed with malignancy, followed by neurological disease and cardiovascular disease.<sup>[8]</sup> A previous study in Japan compared thoracic cancer and noncancer respiratory disease patients dying in a Japanese acute care hospital and found that cancer patients were more likely to have DNR orders than noncancer patients.<sup>[1]</sup>

For hospice care utilization in this study, there was a significantly increased trend of overall utilization rates during the study period from 2010 to 2014. To the best of our knowledge, few studies or reports have focused on the trends in noncancer inpatient hospice utilization, but several studies compared hospice or palliative care utilization among cancer and noncancer patients. Among patients admitted to hospices in the United States in 2013, 63.5% were with a primary diagnosis of noncancer disease.<sup>[9]</sup> In Catalonia, where the World Health Organization demonstration project for palliative care was conducted, there was an equal distribution of cancer and noncancer patients in hospice palliative care.<sup>[10]</sup> However, in other countries or areas the rates of hospice care utilization among noncancer patients is lower. The rate in inpatient units was 11% in the United Kingdom, 5% in Spain (except for Catalonia), 10% in France and 8.1% in Germany.<sup>[11]</sup> Because of the study design, there was no comparable study to ours, but we did find an increased trend of hospice care utilization in noncancer patients, especially between 2013 and 2014 (9.7% vs 15.4%). This improvement might be related to the Hospice Palliative Act amendment in 2013, which allowed the process of withdrawing life-sustaining treatments becoming more humanized.

In the present study, we found significantly increased trends of DNR for each disease during the study period, but increased trends of hospice utilization were only found in COPD and other lung diseases, and renal failure. The Taiwanese government made policies and assisted with announcements to help people to understand and accept hospice care for terminal illness. For cancer patients, studies reported that the hospice utilization rates in Taiwan were 5.5% in 2000, 15.4% in 2004,<sup>[12]</sup> and 17.2% in 2007.<sup>[13]</sup> Previous studies reported that noncancer terminal patients have similar symptoms to cancer patients including nausea and vomiting, anxiety, weakness, and tiredness,<sup>[14–16]</sup> which might be alleviated by hospice care. However, barriers to hospice care for noncancer patients persist, including unpredictable prognosis and unclear referral criteria, fear of opioid use among patients, families or other healthcare professionals, referral reluctance of physicians, and limited palliative resources.<sup>[17]</sup> In Taiwan, another barrier for hospice care utilization may be culture related. Because death and death-related issues are

taboo subjects for some people in oriental culture, and people may misinterpret hospice care as no treatment or giving up all treatments and just let patient die. The result of this misunderstanding, no treatment and let patient die, is against the filial piety of Chinese culture. Therefore, it is important to educate people to know what hospice care is to increase their willingness to receive hospice care.

This study has several limitations. First, the patients were only from one tertiary hospital, which has a well-organized hospice care team, so the results would not represent the general status in medical facilities but only that in hospitals with similar levels and hospice care teams. Second, some sociodemographic characteristics such as education level, marital status, and economical status were lacking in our dataset, so we could not evaluate the association between these sociodemographic characteristics and DNR and hospice care utilization. Third, the dataset used in this study did not contain information about comorbidities, so we could not evaluate the relationship between comorbidities and DNR and hospice care utilization. Fourth, the results of this study could only be generalized to hospitals with similar level to present hospital. Furthermore, some results showed marginal statistical differences should be interpreted carefully. Although these limitations, this is the first study to focus on DNR and hospice care utilization in non-cancer patients including brain diseases, ALS and dementia, COPD and lung diseases, heart failure, chronic liver disease and cirrhosis, and renal failure.

In conclusion, this study is the first study to analyze hospice utilization of noncancer decedents in a tertiary hospital. The percentages of DNR and hospice utilization were significantly different across different disease diagnoses, hospitalization departments, and years. There were increased trends of DNR in major noncancer decedents, and increased hospice care utilization of patients diagnosed with COPD and other lung diseases, and renal failure from 2010 to 2014. However, the hospice care utilization could be improved. Further study to evaluate factors associated hospice care to improve the utilization is suggested.

#### Acknowledgments

The authors would like to thank Taipei Veterans General Hospital for administrative assistance.

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