



Factors Related to Do-Not-Resuscitate Directives among Critically Ill Patients in a Medical Intensive Care Unit

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Objective: This study was to clarify the prevalence of do-not-resuscitate (DNR) and identify the factors related to critically ill patients who have DNR directives or not in a medical Intensive Care Unit (ICU) in Taiwan. **Materials and Methods:** A retrospective chart review of 100 critically ill patients expired between January and December 2012 were included. The outcome was DNR or not when patient expired. Other variables regarding patient's demographics, disease-and DNR-related information were recorded. Logistic regression model was used to assess the related factor about DNR. A $P < 0.05$ was considered statistically significant. **Results:** DNR rates were 87%, and the mean interval from DNR signature to death was 3.9 days. Compared with the patients without DNR signature, the patients with DNR signature had no statistical significance of cancer diagnosis (odds ratio [OR] = 3.41, 95% confidence interval [CI] = 0.88-13.25, $P = 0.076$), and frequency of ICU admission (OR = 4.17, 95% CI = 0.92-18.86, $P = 0.063$). In addition, there were 4.22-fold (95% CI = 0.90-19.89) but no statistical significance ($P = 0.068$) of the frequency of ICU admission by patients with DNR directives compared to those without DNR directives after adjusting the variables of age, gender, economic status, primary diagnosis, and level of consciousness. **Conclusion:** Although this study indicated no statistical significance, we found that a patient with a cancer diagnosis and more frequency of ICU admissions tended to influence on family members concerning DNR directives in clinical setting. Early initiation of palliative care and DNR discussion may enhance the quality of care for dying patients.

Key words: Critically ill patient, do-not-resuscitate, medical intensive care unit

INTRODUCTION

Do-not-resuscitate (DNR) is commonly implemented in the critical care setting as a prelude to end-of-life care because most deaths in the Intensive Care Unit (ICU) are regarded as a way to make death more humane and respect patient autonomy.^{1,2} A common perception in the ICU setting is that life-sustaining interventions such as dialysis or mechanical ventilation may no longer be provided or should be withdrawn on patients who were terminal disease status or aggressive medical care for those were futile.³ Palliative care aims to prevent and relieve suffering by controlling symptoms to provide other support to patients and family members in order to maintain and improve their quality

of life. Although palliative care originally was conceived and practiced as end-of-life care, particularly in cancer patients of terminal stage, more and more studies considered this concept of patients' management may be applied to all kinds of illness which belonged to terminal stages.⁴

The first goal in ICU is to treat and cure critically ill patients. Unfortunately, this goal cannot be achieved because of many unpredictable conditions. If the disease is incurable and the death cannot be avoided, it is an important issue to concern the dying process for patient and family members.⁵ In Taiwan, the family members play a dominant role in the decision of dying process of critically ill patients, particularly in patients without consciousness. Therefore, when dying is unpreventable, family members need to discuss the medical care based on patient's previous wishes like those wanted to experience aggressive management or palliative care without suffering. However, many family members hesitate to discuss these issues because they were afraid of discussing the idea, manner of death or any serious change whether unavoidable death or prolongation of patient's suffering or not.

Recent literature have explored the presence and timing of DNR directives for imminently dying patients.⁶ The spiritual

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background influencing medical decision-making regarding the use of DNR, evaluating the demographic and clinical determinants of having DNR order for adults with cancer, or focus on professionals' attitudes toward and experiences of DNR decisions.⁷⁻¹¹ Nonetheless, evidence concerning the DNR signature in critically ill patients, especially in medical ICU (MICU) was rarely scanty. Therefore, we conducted a retrospectively analysis to elucidate the prevalence and related factors of DNR directives among critically ill patients in an MICU in Taiwan.

MATERIALS AND METHODS

Study design and participants

A retrospective observational study of chart review was performed at MICU of one medical center in Northern Taiwan with an approximately 1800-bed medical center. The MICU comprises two units: The 14-bed cardiovascular unit and 15-bed medical unit. Ethical approval was obtained from the Institutional Review Board of Tri-Service General Hospital (IRB-1-102-05-066). A total of 1280 critically ill patients admitted in MICU during the year of 2012, and 100 patients (7.8%) who expired were included in the analysis during this period. We screened all medical records for these dead patients. Among these patients, 57 were men, and 43 were women, and 87 signed with DNR and 13 did not sign DNR.

Outcomes and variables

The details of the outcome were the family members of a critically ill patient who signed DNR or not when the patient expired. Other variables contained patient's demographics, disease-related information, and DNR-related information. Demographics regarded age, gender, and economic status. Economic status divided into affordable and low-income household. Disease-related information included primary diagnosis, level of consciousness, frequency of ICU admission, and interval from DNR directives to death. The level of consciousness referred to the conscious status of patients when signing DNR. It was rated on an ordinary scale of 1-4, where 1 indicated alert; 2 being stupor; 3 mean semi-coma; and 4 completely coma. DNR-related information involved in DNR interpreter such as physician, nurse, and other professionals and DNR signer including spouse, children, and other relatives. One researcher with more than 10 years of experience in nursing practice collected and recorded the data from the medical chart as well as entered these data into an Excel file.

Statistical analysis

Patient data were anonymized by deidentification and use of numerical data orders, and some data were divided

into two groups, those with or without DNR directives to descriptive analyses. The differences between the group with or without DNR directives were compared using either the two independent sample Student's *t*-test or Fisher's exact probability test. Continuous variables were descriptively expressed as mean $\pm$ standard deviation (SD) and proportions for categorical variables. To determine whether DNR directives are significantly associated with the related factors, logistic regression model was used to calculate the crude and adjusted odds ratios (ORs) and 95% confidence intervals (CIs). All statistical analyses were performed with SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). A $P < 0.05$ was considered statistically significant.

RESULTS

Characteristics of the critically ill patients with and without do-not-resuscitate directives

A total of 100 critically ill patients died in the MICU throughout the study period, and the DNR rates were 87%. The mean interval from DNR directives to death was 3.9 days (SD = 3.0 days) and most DNR consents were signed by their children (83.9%), followed by their spouse (12.6%), and other relatives (3.4%). The main interpreter of DNR was doctor (93.1%), followed by nurse (4.6%), and other professionals (2.3%) (data not shown in table).

The mean age for critically ill patients with and without DNR directives was 82.1 ± 8.7 years, and 79.8 ± 9.6 years, respectively. Gender was not statistically different between these two groups ($P = 0.103$), but the male dominance was both seen in patients with and without DNR directives (54.0% vs. 76.9%). The distribution was not statistically different between the economic status and these two groups ($P = 0.616$). Although primary diagnosis showed no statistical difference between two groups, patients with the noncancer diagnosis were more unlikely to sign DNR than those cancer patients (76.9% vs. 23.1%, $P = 0.058$). Frequency of ICU admission for patients with and without DNR directives was statistically significance (1.5 ± 0.6 vs. 1.2 ± 0.4 , $P = 0.008$) [Table 1].

The related factors of patients with and without do-not-resuscitate directives

Table 2 shows the OR of the critically ill patients with and without DNR directives before and after adjusting the other variables. Compared with the patients without DNR directives, the patients with DNR directives had no statistical significance in patients with cancer diagnosis (OR = 3.41, 95% CI = 0.88-13.25, $P = 0.076$), and frequency of ICU admission (OR = 4.17, 95% CI = 0.92-18.86, $P = 0.063$) before adjusting the other variables. In addition, there were 4.22-fold (95% CI = 0.90-19.89, $P = 0.068$) of the frequency

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of ICU admission by patients with DNR directives compared to those without DNR directives after adjusting the variables of age, gender, economic status, primary diagnosis, and level of consciousness.

DISCUSSION

Studies on end-of-life care are still lacking in Taiwan, with most focusing on general ward, surgical ICU or cancer population.^{8,12-14} Our study investigated the DNR issues on

Table 1. Comparisons of demographics and disease-related information with and without DNR directives in critically ill patients

Variables	Mean $\pm$ SD/n (%)		P
	With DNR (n = 87)	Without DNR (n = 13)	
Age	82.1 $\pm$ 8.7	79.8 $\pm$ 9.6	0.381
Gender			
Male	47 (54.0)	10 (76.9)	0.103
Female	40 (46.0)	3 (23.1)	
Economic status			
Affordable	78 (89.7)	12 (92.3)	0.616
Low-income household	9 (10.3)	1 (7.7)	
Primary diagnosis			
Cancer	44 (50.6)	3 (23.1)	0.058
Noncancer	43 (49.4)	10 (76.9)	
Level of consciousness	1.9 $\pm$ 0.7	1.8 $\pm$ 0.8	0.559
Frequency of ICU admission	1.5 $\pm$ 0.6	1.2 $\pm$ 0.4	0.008

SD = Standard deviation; ICU = Intensive care unit; DNR = Do-not-resuscitate

critically ill patients of MICU in Taiwan. Although the results showed no statistical significance before or after adjusting the other variables, we found that patient with cancer diagnosis, and with more frequency of ICU admissions tended to influence patients' family signature of the DNR in clinical setting.

Do-not-resuscitate rates in patients who ultimately died were about 87%. The previous studies of DNR rates were 65-80% in Asian countries,¹³⁻¹⁵ and 60-65% in Western countries.^{6,16} These subjects stayed in the general ward or surgical ICU and the less times of admission. Surgical patients less frequently received a DNR directive than medical patients.¹⁷ There were different conditions between medical and surgical patients. We also believed the difference due to different attitudes among physicians and the international differences in cultural perspectives on end-of-life issues. In Taiwan, doctor played the key role to explain DNR as well as in other countries.¹⁸ Training background and level of seniority in critical care provider do not impact opinion on most of end-of-life issues related to the care of critically ill patients.¹⁰ In this present study, the mean interval from DNR signature to death was 3.9 days, and all of the DNR consents were signed by their children, spouse, and other relatives. These findings were consistent with prior studies.^{13,19} Most of the patients had DNR directives in the last days of life,⁶ and only approximately 6% of patients participated in DNR discussion.¹⁹ The earlier palliative care was associated with earlier DNR designation.²⁰ Therefore, more work is required to improve our quality of end-of-life care.

In the past, extremely rare patients had DNR directives on ICU admission, despite their critical illness were terminal or irreversible. Recently, Taiwan Government promoted the

Table 2. Crude and adjusted ORs and 95% CIs of demographics and disease-related information with and without DNR directives in critically ill patients

Variables	Crude estimate			Adjusted estimate		
	OR	95% CI	P	OR	95% CI	P
Age, years	1.03	0.97-1.09	0.381	1.02	0.96-1.09	0.454
Gender						
Male	1.00	Reference		1.00	Reference	0.223
Female	2.84	0.73-11.02	0.132	2.43	0.58-10.17	
Economic status						
Affordable	0.72	0.08-6.22	0.767	0.56	0.05-5.97	0.559
Low-income household	1.00	Reference		1.00	Reference	
Primary diagnosis						
Cancer	3.41	0.88-13.25	0.076	3.08	0.76-12.50	0.116
Noncancer	1.00	reference		1.00	reference	
Level of consciousness	1.29	0.55-3.00	0.556	1.17	0.46-2.96	0.745
Frequency of ICU admission	4.17	0.92-18.86	0.063	4.22	0.90-19.89	0.068

CI = Confidence interval; DNR = Do-not-resuscitate; OR = Odds ratio; ICU = Intensive care unit

hospice palliative care regulation to emphasize the palliative care and good death in terminal stage, not only for cancer patients but also for noncancer patients. Although doctors did not promote resuscitation for the terminal patients, the effects of palliative care and the quality of dying in the hospital remain poor. Piers *et al.* conducted a prospective observation of DNR decisions in patients dying in a Belgian University Hospital and they found that surgical patients and patients with nonmalignant diseases were more often referred to ICU at the end-of-life.¹⁷ Fujimoto *et al.* reviewed the medical records to compare the decision-making process, especially timing and decision-maker, of DNR directives between patients with thoracic cancer and patients noncancer respiratory diseases in a Japanese Acute Care Hospital.¹⁹ They found that cancer patients were more likely to have a DNR directive placed earlier and decided in advance of last admission, and were more likely to have normal cognitive function at the time of the DNR signatures than noncancer patients. Spouses of cancer patients were also more likely to participate in DNR discussion. In addition, cancer patients less frequently received aggressive treatment at the end-of-life, and in place of death, they were more likely to die in general wards than in ICUs.¹⁹

Although the results showed no statistical significance before or after adjusting the other variables, our study showed that family members of critically ill patients were tended to sign DNR with more frequency of ICU in clinical setting. A study examined the clinical factors influencing DNR consent signed in the surgical ICU and found that the interval from DNR consent to death was around 2.0-3.5 days, older age was significantly associated with DNR consents signed.¹³ Another study described the presence and timing of DNR orders for imminently dying patients and found that 32% of patient had DNR orders within the last 24 h, 8% within 1-2 days prior to death, 22% > 7 days prior to death.⁶ The medical records of cancer deaths were reviewed and identified that earlier palliative care was associated with earlier DNR signature and less frequent ICU deaths.²⁰ In our MICU, physicians usually explain DNR to families only when the ineffective treatments or irreversible death. Therefore, early initiation of DNR discussion by physicians should be promoted in order to have a good death in end-of-life care.

This study has a number of limitations. First, as our study population focused on a single medical center, the generalizability of our findings is limited. Second, as this study only addressed critically ill patients admitted in MICU, diverse disease backgrounds may influence on different medical decisions by health providers and their families. Third, we did not provide any information such as religious status and educational level of patients' families for DNR decision process in our present study. Finally, some demographic and disease

and treatment-related characteristics were dichotomized; this strategy may have affected the interactions with outcomes. Based on the results of this study, future studies along the following lines are warranted. First, critically ill patients in other hospitals in Taiwan should recruit to confirm our findings. Second, critically ill patients in other units are needed to increase the applicability and generalizability of results to the overall critical population. Third, studies to collect the information from families are needed to explore the impact on DNR decision. Finally, the variables of demographics and disease-related characteristics should be measured and classified into more groups to predict future outcomes.

CONCLUSION

Although this retrospective study showed no statistical significance before or after adjusting the other variables, we found that patient with cancer diagnosis, and with more frequency of ICU admissions tended to sign DNR in clinical setting. We also found that the timing of patients' family members complete DNR directives were usually closer to the time of death of patients and this time usually influenced by the physician who provides daily health care. Therefore, early intervention of palliative care and DNR discussion among the patients, their families and health providers are important and enhance the quality of dying for the critically ill patient at the terminal stage.

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