

Characteristics of Residents With Do-Not-Resuscitate Orders in Nursing Homes

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We determined patient characteristics associated with do-not-resuscitate (DNR) status in nursing homes using cross-sectional analysis of secondary data derived from Minimum Data Set documents in 14 nursing homes from one state in the upper Midwest. The primary outcome variable was DNR status. Bivariate analysis was first carried out on all variables. Variables associated with DNR status at this stage were then included in a stepwise logistic regression to determine variables independently associated with DNR status. Overall, 71% of patients had DNR orders. Variables found to be independently associated with a higher probability of DNR status were increasing age, female gender, worse cognitive function, durable power of attorney, being self-paying, or having commercial insurance. Lack of daily contact with relatives and friends and lack of involvement with others were associated with lower probability of DNR status. A higher prevalence of DNR status in nursing homes was seen than in prior literature. The patient characteristics shown to be associated with DNR status may give important insight into the reasons that such decisions are made. (*Arch Fam Med.* 1995;4:463-467)

The use and outcomes of cardiopulmonary resuscitation (CPR) in nursing homes has received much attention in the literature.¹⁻³ With increasing awareness of the poor outcomes of CPR, attention has been paid to do-not-resuscitate (DNR) orders for patients residing in nursing homes. A few studies have examined the prevalence of DNR orders among nursing home patients. Meyers and colleagues⁴ found that 27% of patients within a single hospital's extended care program had DNR orders. Holtzman et al⁵ sampled patients within one county's Medicaid system and found that the percentage of DNR orders had increased from 12% to 37% between 1984 and 1988. In addition to assessing the proportion of patients who have DNR orders, these studies have

also examined patient factors that are associated with DNR orders. There have been inconsistent findings from these studies regarding associations with age, sex, functional status, and other factors thought to influence DNR status.^{4,5}

The Minimum Data Set (MDS) is a document that, since 1991, must be filled out by all nursing homes on all residents at specified times during a resident's admission.⁶ Although not required at this time to be collected by some central agency and analyzed, nursing homes comply with this requirement under the threat of sanction. In addition to many data items regarding the patients' demographic characteristics, care requirements, and functional capacity, the MDS includes items regarding the DNR status of patients. To determine patient characteristics associated with DNR status and to gain insight into how such decisions may occur, we analyzed the MDS data from a sample of area nursing homes.

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Table 1. Variables From Multiple Data Set Used in Analysis

Marital status	Past roles
Admission source	Strong identification with past roles and life status
Lived alone	Expresses sadness, anger, or empty feeling over lost roles and status
Gender	None of above
Race	General activity preferences, spiritual and/or religious activity
Age	Heart and/or circulation diseases
Discharge planned within 3 mo	Arteriosclerotic heart disease
Reason for assessment	Cardiac dysrhythmias
Primary payment source	Congestive heart failure
Medicaid	Hypertension
Medicare	Hypotension
Commercial insurance	Peripheral vascular disease
Self-paying	Other cardiovascular disease
Responsible party/legal guardian	Neurological diseases
Legal guardian	Alzheimer's
Other legal oversight	Dementia other than Alzheimer's disease
Durable power of attorney or health care proxy	Aphasia
Family member	Cerebrovascular accident (stroke)
Resident	Multiple sclerosis
None of above	Pulmonary diseases
Advance directives	Emphysema, asthma, or chronic obstructive pulmonary disease
Do not resuscitate	Pneumonia
Do not hospitalize	Psychiatric and/or mood diseases
Restricted feeding	Anxiety disorder
Comatose	Depression
Cognitive skills for daily decision making	Manic depression (bipolar disease)
Bed mobility	Cancer
Ability to transfer	Explicit terminal prognosis
Locomotion	Nutritional approaches: feeding tube
Ability to dress	Number of medications in last 7 d
Ability to eat	Residential history
Toilet use	Prior stay at this nursing facility
Personal hygiene	Prior stay at other nursing or residential facility
Ability to bathe	None of above
Change in activities of daily living function	Involvement patterns
Unsettled relationships	Daily contact with relative and/or close friend
Absence of personal contact with family and/or friends	Usually attends church, temple, or synagogue
Recent loss of close family member and/or friend	None of above
	Current level of care

METHODS

NURSING HOMES AND PATIENTS

Fifteen nursing homes in one state in the upper Midwest area subscribe to an MDS data entry system designed by one of us (J.B.). These nursing homes all agreed to supply their data for the study. Although not chosen at random, these nursing homes did not have any particular affiliation or characteristic that would readily differentiate them from other nursing homes in the area. Data from one nursing home were excluded after we received them because all the patients had DNR orders and would not contribute any statistical power to the analysis. Other records were excluded because of missing data on dates of birth and of assessment, the age of residents was less than 40 years, or residents had histories of mental retardation and developmental delay.

DATA AND DATA ELEMENTS

The entire MDS consists of several hundred variables organized into 16 sections. It is required to be filled out

on admission and on important changes in a patient's condition. Nursing homes are responsible for filling out their own forms. No way was available to us to validate the accuracy of data from the MDS. For this study, we chose a subset of 73 variables that we thought might be relevant to the decision to issue DNR orders for a patient. These variables included financial variables such as payment source, guardianship, several measures of physical and intellectual function, current illnesses and diagnoses, and some specific questions on social involvement (**Table 1**). While most of the variables were binary, some of the variables measuring functional status were ordinal, with four possible categories. The most recent assessment available for each patient in January 1994 was used in the analysis.

ANALYSIS

Univariate associations of patient characteristics and DNR status were tested for significance using the Pearson χ^2 test. To examine characteristics independently associated with DNR status, stepwise logistic regression was carried out so that the most important vari-

Table 2. Description of Study Sample

Variable	Data*
Female	78
Mean (\pm SD) age, y	84.7 \pm 8.4
Ability to transfer	
Independent	30.2
Supervised	5.2
Limited assistance needed	15.6
Extensive assistance needed	19.4
Totally dependent	29.6
Primary payment source†	
Medicaid	52.8
Medicare	4.2
Self-paying or commercially insured	37.6

*Unless otherwise indicated, data are given as percentages.

†Percentages do not total 100 because of small percentages of other categories not listed.

Table 3. Patients With DNR Orders*

Variable	% of Patients
Type of advance directive	
DNR order	71
Do-not-hospitalize order	8
Feeding restrictions	38
Patients with DNR orders	
Male	64
Female	73
Age, y	
<81	57
81-85	71
86-90	76
>90	80
Cognitive skills in daily life	
Independent	68
Modified independence	67
Moderately impaired	69
Severely impaired	82

*DNR indicates do not resuscitate.

ables associated with DNR status, as assessed by the change in log likelihood, were first forced into the model, followed sequentially by the next variable that produced the largest change in log likelihood that was statistically significant at the level of $P < .05$. Only variables that were statistically significant in the univariate analyses were considered for the logistic model. Analysis was carried out using the LOGIT module of the SYSTAT statistical program for personal computers (SYSTAT, Evanston, Ill).

RESULTS

The 15 nursing homes recruited for the study ranged in size from 30 to 472 residents, with a median size of 143. There were two proprietary (for-profit) nursing homes, and three were run by local counties.⁷ The rest were non-profit corporations, several of which were affiliated with churches. We originally received files with entries for 1904 patients. After exclusion of records as noted above, 1723 (90%) were used in the analyses. Some descriptive char-

acteristics of the sample are shown in **Table 2**. Most of the patients were female, and their mean (\pm SD) age was 84.7 \pm 8.4 years old.

The overall proportion of patients in the 14 nursing homes used in the analysis who had a DNR order was 71%. The MDS also contains two other items relating to care restrictions. A do-not-hospitalize order was found for 8%, and 38% had some kind of feeding restriction. **Table 3** shows some subgroups of patients and the actual proportions who had DNR orders. A clear trend can be seen with respect to both increasing age and severity of cognitive function.

Table 4 shows which variables, of all the variables we examined, were significantly associated with DNR status in univariate analyses. Of note, all the activities of daily living (transfer, locomotion, eating, and toilet use) were associated with DNR status. Because these separate activities of daily living were all highly correlated, these variables were collapsed into a single variable with four categories representing the average of the activities of daily living variables.

Table 5 shows the results of the final logistic regression model, indicating which of all the variables that were significantly associated with DNR status on univariate analysis were still significant. Seven of the variables entered the model. Patients who were older, female, and more cognitively impaired; had a durable power of attorney; and were self-paying or paid by commercial insurance were more likely to have DNR orders. Patients who reported absence of daily contact with relatives and friends and or no involvement with others were less likely to have DNR orders. Cognitive skills for daily decisions and activities of daily living were highly correlated, so that only cognitive skills entered the regression model. When the activities of daily living variable was forced into the model, the results were essentially identical, except that the cognitive skills were not significant.

COMMENT

Our results demonstrate the recent prevalence of DNR orders in a sample of nursing homes and some patient factors independently associated with DNR status. These results show some interesting conclusions, compared with the work of other investigators. The overall prevalence of DNR status, 71%, is much greater than the earlier results reported by either Meyers et al⁴ or Holtzman et al.⁵ An important difference between our study and these other reports is that the sample populations in the other studies came from an urban teaching hospital that cares largely for indigent patients. Our sample of nursing home patients is not so heavily skewed in this way. The cross-sectional method we employed is similar to that used in the other studies. Owing to differences in lengths of stay and patient survival, the prevalence of DNR orders is different from the proportion of patients receiving DNR orders. We have no reason to suspect that these factors differed systematically between studies. Perhaps the major reason for the difference in our results is the more recent time period of our study. The trend reported by Holtz-

Table 4. Univariate Predictors of DNR Status*

Variable	DNR Status Indicated
Female	+
Older age category†	+
Payment source	
Medicare	-
Self-paying or commercially insured	+
Responsible party or guardian	
Durable power of attorney	+
Resident	-
Worse cognitive skills‡	+
Activities of daily living	
Worse transfer†	+
Worse locomotion†	+
Worse eating†	+
Worse toilet use†	+
Worse recent change in activities of daily living‡	+
Absence of personal contact with family and/or friends	-
Recent loss of family and/or friend	-
Anxiety disorder	-
Daily contact with relatives and/or friends	-
No involvement patterns	-

*DNR indicates do not resuscitate; plus sign, those with characteristic had a greater proportion of DNR orders; and minus sign, those with characteristic had a lower proportion with DNR orders.

†Determined by χ^2 test for 2x4 table, four categories for variable.

‡Determined by χ^2 test for 2x3 table, three categories for variable.

Table 5. Logistic Regression Results for Variables Independently Associated With DNR Status*

Variable	Odds Ratio†	P
Age, y		
<81	0.32	<.001
81-85	0.56	
86-90	0.75	
>90	Referent	
Female gender	1.30	.04
Cognitive skills, daily decisions		
Independent	Referent	<.001
Modified independence	0.88	
Moderately impaired	0.62	
Severely impaired	2.26	
Durable power of attorney	1.50	<.001
Self-paying or commercially insured	1.28	.04
No involvement patterns	0.68	.04
Absence of personal contact with family and/or friends	0.29	<.001

*DNR indicates do not resuscitate.

†Odds ratio is calculated by raising e to the exponent of the value of the logistic regression coefficient. For categorical variables, the odds ratio is the odds of having a DNR order if the patient has the characteristic divided by the odds of having a DNR order without the characteristic. Given that the outcome (DNR orders) assessed here is not rare, the odds ratio is a considerable overestimate of the risk ratio and should not be interpreted as such.

man et al.,⁵ showing an increased proportion of residents with DNR orders between 1984 and 1988, has probably continued and accelerated into the 1990s. Although this proportion is high, this still leaves a significant proportion of patients in nursing homes eligible for

CPR. We have previously shown that CPR is rarely performed in nursing homes.⁸ This suggests that the patients who do not have DNR orders are either at low risk of death or that CPR is rarely performed even in the absence of DNR orders, as has been suggested by Finucane et al.⁹ Thus, this increase in documented DNR orders may represent better documentation of how nursing homes have actually been operating rather than an explicit change of practice.

Like other investigators, we found that age and functional status (collinear with cognitive ability in our study) were associated with DNR status. The effect of female gender has been inconsistent in other studies, because it has generally been significant in univariate analyses but not in logistic regression.^{4,5} This could be due to both sample size and the nature of the other variables included in the logistic models. However, the odds ratio obtained in our study is consistent with that of other investigators who did not find statistical significance.

Unique to our study are associations with payer status and some questions regarding social involvement. Self-paying patients or patients who had commercial insurance were more likely to have DNR orders. This might be an indirect association with socioeconomic status, as patients who are wealthier might be more likely to pay for themselves or to have bought insurance. It has been the anecdotal experience of the investigators that patients of higher socioeconomic status seem to choose DNR status more readily. The associations with lack of personal contact and no involvement patterns with others were unexpected and should be viewed as tentative associations that need further confirmation. However, a possible explanation is that patients' families and friends are instrumental in the decision-making process that leads to a DNR order. In the absence of such social supports, the decision is either not made or a DNR order is declined. Also of interest is that none of the medical diagnoses were associated with DNR status, even in the univariate analyses.

There are several limitations of this analysis. Perhaps the most severe limitation is our inability to validate the accuracy of the variables on the MDS. Although several of the items such as age and gender are simple and only subject to recording error, items such as activities of daily living and cognitive function may be subject to differing interpretation by individual nursing homes. These differences in recording would tend to bias estimates of association toward no association, as long as the errors are not associated with DNR status. Although much work needs to be done to validate the accuracy of the MDS,¹⁰ it is a potentially rich database that can provide much important information about current residents of nursing homes. Another limitation is the sample, which is a set of nursing homes in our area that happened to purchase one particular data entry system for MDS. However, we have no particular reason to question the representativeness of these nursing homes as typical of our area. Most nursing homes have purchased such a product from a variety of vendors. Last, a cross-sectional study such as this cannot clarify the causal direction of certain associations. For example,

although it seems plausible that having a durable power of attorney might promote the use of DNR orders, patients' decisions to obtain a DNR order might cause them to want to have a durable power of attorney. The reader should also take note of the large initial number of variables that were examined in this study. Thus, some of the associations could have been due to random variation, particularly those that were unexpected. However, correction of significance testing using a method such as the Bonferroni method would have made our analysis overly conservative and made all the associations nonsignificant, even those that are supported by other research.

Also not addressed in our study is the impact of explicit or implicit nursing home policies regarding DNR orders on patient decision making. Although such policies could definitely influence the prevalence of DNR orders in a given nursing home, such a question would require an ecologic approach and a greater number of nursing homes enrolled in the study. An assumption of our method is that, to the extent that such policies do influence patients' decisions, these policies do not interact with the characteristics of the patients assessed in our models.

Although our study finds certain patient characteristics associated with DNR status, it only raises questions rather than answers the critical questions regarding such status. Although women, independent of other characteristics, are more likely to have DNR orders, this does not mean that the orders are inconsistent with the patients' desires or that such decision making is flawed for one gender or the other. The association of DNR status with measures assessing communication with family and friends suggests the importance of social supports in making important decisions and should be studied

in further detail. An analysis using a database such as the MDS could not be expected to answer such a complex question and therefore can only raise such issues as possible questions for more direct research. The rising proportion of patients with DNR orders represents an important trend in the care of nursing home patients that should be observed and studied.

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