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Treatment-Seeking Delays in Heart Failure Patients

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Background: Patients having cardiac symptoms often delay for hours before seeking treatment. Delay time is usually defined as the amount of time between the patient's first awareness of symptoms and arrival at the hospital. Excessive delays in seeking medical care for heart failure (HF) symptoms may influence patient outcomes. However, the treatment-seeking patterns of HF patients are not well understood.

Methods: We obtained data through a retrospective chart audit to describe the treatment-seeking behaviors of 753 HF patients, at a Veterans Administration facility, and to identify predictors of delay in seeking medical care for HF symptoms. Using univariate and multivariate analyses, we assessed relationships among delay time, presenting symptoms, and patient characteristics.

Results: The mean delay time was 2.93 ± 0.68 days. The most common symptoms on admission were dyspnea (76%), edema (66%), fatigue (37%), and angina (25%). Variables negatively affecting delay time included presence of dyspnea and edema (odds ratio [OR], 2.10 and 1.82; confidence interval [CI], 1.38 to 3.19 and 1.17 to 2.82, respectively), care by a primary care physician (OR, 2.04; CI, 1.45 to 2.88), and higher New York Heart Association (NYHA) Class (OR, 1.96; CI, 1.47 to 2.61). Variables positively affecting delay time were the presence of chest pain (OR, 0.42; CI, 0.29 to 0.62) and a history of previous admission for HF (OR, 0.42; CI, 0.28 to 0.62).

Conclusions: Delays in seeking treatment for HF symptoms are significantly high. This study supports the need for interventions that will increase early symptom recognition and management on the part of patients and their families. J Heart Lung Transplant 2000;19:932–938.

Patients who have cardiac symptoms often delay for hours before seeking treatment.[1] Delay time is usually defined as the amount of time between the first awareness of symptoms and the individual's arrival to the hospital. Excessive delays in seeking medical care for symptoms contribute to higher morbidity and mortality in cardiac patients.[2–4] Dracup and Moser[5] conducted a review of the research related to delays in treatment-seeking behavior of patients with symptoms of acute myocardial infarction (AMI) over the past 2 decades and found that 26% to 44% of patients delayed longer than 4 hours. Long delays in patients with heart failure (HF) decompensation have also been reported, with patients having experienced worsening symptoms for one half day to 7 days, on average, before hospital admission.[6]

Many reasons are cited for delays in seeking

treatment. However, most of the prior studies have been limited to examining the treatment-seeking behaviors of patients with AMI, whereas only 1 has been conducted in patients with HF.[6] Therefore, additional research is needed to better understand reasons for long delays in this patient population. The objective of the current study was to address this need. The specific aims of the study were to (1) describe delay times between symptom onset and hospital admission, (2) examine the influence of previous HF hospitalizations on delay times, (3) assess the most common symptoms on admission for HF decompensation, and (4) identify the predictors of treatment-seeking delays. Elucidation of factors that contribute to treatment delays for HF patients may permit the development and testing of interventions directed toward decreasing patient decision time; reducing morbidity, mortality, and health costs; and improving patient outcomes.

METHODS
Study Subjects and Data Source

The study patients had been discharged from the Greater Los Angeles Veterans Administration (VA) Medical Center with a primary diagnosis of HF from 1997 through 1998. Patients were identified by the International Classification of Disease-9-Clinical Modification codes (428.0, 428.1, and 428.9). We completed an initial review of medical records for 795 patients (from a database of 1,190 patient discharges). We excluded medical records from further analysis if the primary reason for admission was non-cardiac (e.g., fracture, management of diabetes).

Of the original 795 records, 753 were retained for data analysis. We abstracted sociodemographic and clinical characteristics of patients from the medical records. The same investigator (L.E.) obtained from the admission profiles information related to pre-hospital delay times. After analysis of the data for the index admission, we also obtained delay times for subsequent admissions for patients with multiple admissions. The delay times across admissions were compared for changes in treatment-seeking behaviors of HF patients with subsequent admissions.

To assess the most common symptoms on admission, we also obtained from the admission profiles data specific to type of symptoms experienced by the patients before their index hospital admissions. We included in the analysis all documented symptoms that patients reported (e.g., edema, weight gain, fatigue, chest pain, palpitations, and cough). Dyspnea and shortness of breath were both coded as

**TABLE I** Patient characteristics of the sample ($n = 753$)

	n	*%*
Gender		
Male	743	98.7
Female	10	1.3
Race		
White	456	60.6
Black	214	28.4
Other races	83	11.0
Employment status		
Employed	109	14.5
Unemployed	89	11.8
Retired	555	73.7
Marital status, %		
Married	281	37.3
Not married	472	62.7
NYHA class		
Class 1	221	29.3
Class 2	417	55.4
Class 3	112	14.9
Class 4	3	.4
Specialty of physician provider		
Cardiologist	286	38.0
General practitioner	467	62.0

NYHA, New York Heart Association.

"dyspnea" to coincide with Friedman's prior study of symptom identification.[6]

Statistical Analysis

We used descriptive statistics to characterize the duration of delay before admission, type of symptoms that patients reported on admission, and sociodemographic and clinical variables. Because no pre-determined classification time exists for HF patients, we conducted analyses using the median delay time of 3 days (72 hours) from the current sample to create 2 groups of patients: those with short delay times (<3 days) and those with long delay times (≥3 days). The significance of differences between the 2 groups was determined using 2-tailed tests for dichotomous variables or analysis of variance F tests when several categories were compared. Variables significant at an alpha level of 0.10 were included in a multiple logistic regression analysis. Chi-square statistics were used to assess the odds ratio for arriving at the hospital within 3 days of symptom onset. In the final model, we considered significant only variables with probability values ≤0.05.
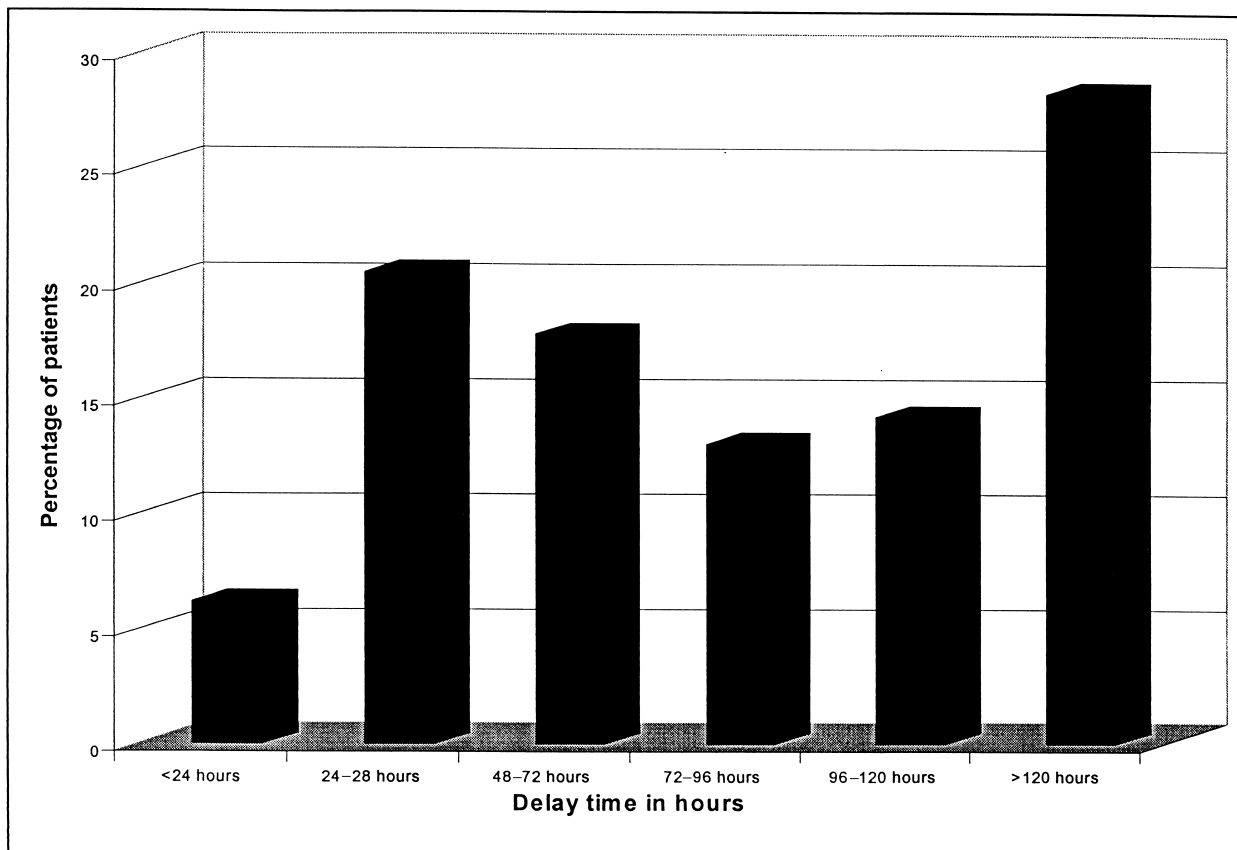
FIGURE 1   Delay intervals for index admission ($n = 753$).

RESULTS

Patients in the sample ranged in age from 35 to 99 years, with a mean age of 69 years (± 11.7). Approximately three fourths of the patients were 60 years or older. Almost all were men (98.7%), reflecting the VA population. Table I lists additional sociodemographic and clinical characteristics of the sample. Of the 753 patients in the sample, 220 (29.2%) patients had more than 1 admission (range, 2 to 9; mean, 2.79 readmissions).
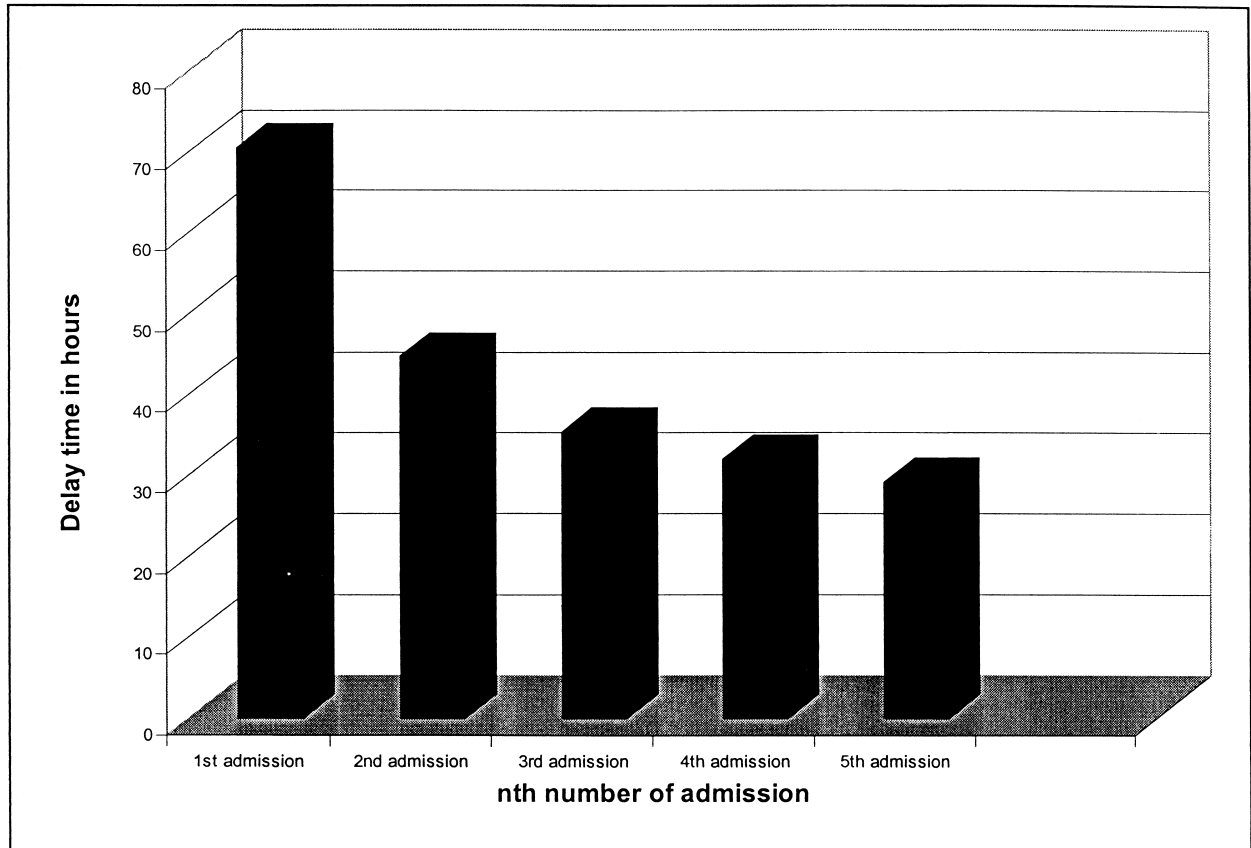
Delay Times

Mean time from the onset of worsening symptoms to the arrival at the hospital was 2.93 $\pm$ 0.68 days (70.5 hours). Median time was 3 days (72 hours). Figure 1 illustrates the distribution of time between the first awareness of symptoms and time of arrival at the hospital. The figure demonstrates the long delay times before seeking care for symptoms. Less than 5% of the patients sought care within 1 day (24 hours), whereas almost 30% of the patients delayed for more than 5 days (120 hours). As illustrated in

Figure 2, delay time decreased with repeated admissions to 1.86 $\pm$ 1.93 days (44.6 hours) for the second admission ($n = 220$), 1.47 $\pm$ 1.57 days (35.3 hours) for the third admission ($n = 89$), 1.33 $\pm$ 1.13 days (31.9 hours) for the fourth admission ($n = 45$), and 1.21 $\pm$ 0.92 (29.1 hours) for the fifth admission ($n = 19$).

Presenting Symptoms

Dyspnea and edema were the 2 most frequent symptoms, occurring in 76% and 65% of patients, respectively. Additional symptoms reported included fatigue (37%) and angina (25%). A small percentage (4.6%) of patients complained of other symptoms, which included cough, palpitations, weight gain, and sleeplessness. Patients in Group 2 who had longer delay times were more likely to present with dyspnea and edema ($p < 0.05$). On the other hand, chest pain occurred more often in the patients who delayed less than 72 hours ($p = 0.0001$).

FIGURE 2   Mean delay time in hours across admissions ($n = 753$).

Predictors of Delays

Table II illustrates differences in sociodemographic and clinical characteristics of delayers and non-delayers. Significant differences ($p < 0.05$) between the 2 groups were observed in New York Heart Association (NYHA) class, type of physician provider, and history of previous HF admissions. We tested factors associated with delays in treatment-seeking patterns using a multivariate logistic regression model. Factors that predicted an approximate 2-fold risk of increased delay times included the presence of dyspnea and edema, care provided by a primary care provider, and higher NYHA class. Factors associated with lower likelihood of delay were presence of chest pain and previous history of HF admissions.

DISCUSSION

The median delay time of 3 days (72 hours) found in this sample of patients with HF is similar to that of a prior study that examined delay times among HF patients.[6] The mean and median delay times were similar in the current study. In contrast, mean delay times in AMI patients are considerably longer than median delay times because of the skewed distribution caused by individuals who waited many hours or even days before seeking medical care.[5]

The presence of previous HF hospitalization predicted shorter delay times. In contrast, patients with a previous history of HF[7] or angina[8] actually have increased delay times when responding to the symptoms of AMI. Unfortunately, although delay times decreased with subsequent admissions in the current study, they remained significantly high.

The most common symptoms reported on admission among patients were dyspnea and edema, symptoms commonly experienced by HF patients.[9,10] Patients who presented with these 2 symptoms had delay times approximately twice as long as those who did not have these symptoms. Such delay could be attributed to the fact that patients with HF often experience these 2 symptoms as part of their chronic condition and attempt to manage them at home before seeking health care.[11] Furthermore, in

TABLE II   Differences in patient characteristics between short and long delay groups

	Group 1 $n = 335$ (<3 hours)	Group 2 $n = 418$ (≥3 hours)	t-test	p value
Age, (mean ± SD)	60.03 ± 11.74	69.06 ± 12.09	−0.42	.534
Gender, %			.058	.114
Male	98.2	99.0		
Female	1.8	1.0		
Race, %			−0.10	.783
White	59.4	61.5		
Black	29.9	27.3		
Other races	10.8	11.2		
Employment status, %			−1.15	.089
Employed	84.2	84.9		
Unemployed	15.8	15.1		
Marital status, %			−.058	.395
Married	63.0	61.7		
Not married	37.0	38.3		
Living arrangement, %			.005	.891
Alone	48.1	48.6		
With someone	51.9	51.4		
NYHA class, %			.259	.000
Class 1	41.8	19.4		
Class 2	49.6	60.0		
Class 3	8.4	20.1		
Class 4	.3	.5		
Type of physician provider, %			.234	.000
Cardiologist	59.1	35.6		
General practitioner	40.9	64.4		
Number of admissions, %			−.077	.034
Single (index admission)	66.9	73.9		
Multiple (>1 admission)	33.1	26.1		

NYHA, New York Heart Association.

most instances, dyspnea and edema are not acute symptoms, but progress slowly. The slow progression of symptoms is the strongest single predictor of delay in AMI,[12] and may lead to longer delays in HF patients who are unaware of their importance.

The presence of chest pain reduced delay times among patients. Prior studies in AMI patients have shown that only chest pain accompanied by hemodynamic instability reduces delay time[7] and that chest pain alone does not differentiate delayers from non-delayers.[11,12] However, in HF patients the presence of chest pain may contribute to patients' recognition that their symptoms are cardiac in origin, a factor previously shown to decrease delay times.[13]

Several of the sociodemographic variables associated with longer delay times in the AMI population, namely older age[4,7] and black race,[3,6,14] were not related to longer delays in this sample. More than three fourths of the patients were >60, which probably accounts for the lack of significant difference between the 2 groups by age. Lack of significance for racial differences is probably related to similar socioeconomics among races, as all patients who sought care at the VA and had similar access to care. Researchers have suggested that racial differences were really related to barriers to care experienced by patients of lower socioeconomic status.[3,6,14]

Among the clinical variables, significant predictors of delay included NYHA classification and care provided by a primary care provider. The NYHA class reflects functional status and measures severity of symptoms. In the current study, those with more severe symptoms (NYHA Class III–IV) were less likely to delay seeking treatment. Severity of symptoms and degree of incapacitation also reduced delay times in previous studies of AMI.[15] We cannot explain why delay time was doubled among patients seen by primary

care physicians as opposed to a cardiologist because of the retrospective design of the study. However, we can hypothesize that cardiologists instruct patients to go to the emergency department, whereas primary care physicians request that patients call with symptoms. Consequently, when these patients consult their physicians, increases in delay may be caused by a variety of reasons, including physicians who don't perceive the symptoms as cardiac in nature or physician recommendations to try self-medication.[15,16]

Limitations of the study include the retrospective design of the research and the nature of the data about delay. We were forced to rely on the interviewing skills of the health care provider and the patient's or family member's memory of symptom onset during an emotional and stressful time in the emergency department. Furthermore, we conducted the study on a homogeneous sample of veterans who were predominantly male and who had similar socioeconomic backgrounds, and therefore sociodemographic differences previously shown to predict delays in patients with AMI were not detected. The results cannot be generalized to women, who have been found to be at higher risks for delay.[6] Finally, other factors aside from sociodemographic and clinical characteristics may be more important for a complete understanding of the excessively long delays that we observed,[17,18] but these were beyond the scope of the study.

CONCLUSION

Although previous hospitalization with HF decreased delay time between symptom onset and hospital admission, the delays in seeking treatment for HF symptoms remain relatively high. The findings of this study elucidate the health-care seeking patterns of HF patients and help clinicians identify patients who are likely to delay seeking treatment.

The study also has some valuable implications for future research. Although the current study provides the groundwork for allowing clinicians to identify patients at risk for long delays, investigations that examine the predictor of delay with a less homogenous population (e.g., inclusion of more females) is needed. Additional research with a prospective design will also allow researchers to identify psychosocial reasons for delay. An understanding of the cognitive, emotional, and social processes that contribute to patients' decisions to seek treatment may help clinicians effectively counsel their patients and patients' families to avoid delays and consequently improve outcomes, and reduce the morbidity, mortality, and health care costs associated with HF.

TABLE III   Predictors of delay ($n = 753$)

	OR	95% CI
Factors negatively affecting delay		
Presence of edema	2.10	1.38–3.19
Care provided by a primary care physician	2.04	1.45–2.88
Higher NYHA class	1.96	1.47–2.61
Presence of dyspnea	1.82	1.17–2.82
Factors positively affecting delay		
Presence of chest pain	0.42	0.29–0.62
History of previous admission for HF	0.42	0.28–0.62

CI, confidence interval; HF, heart failure; NYHA, New York Heart Association; OR, odds ratio.

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