MAYO CLINIC

Discharge Against Medical Advice in the United States, 2002-2011

Kiara K. Spooner, DrPH, MPH; Jason L. Salemi, PhD, MPH; Hamisu M. Salihu, MD, PhD; and Roger J. Zoorob, MD, MPH

Abstract

Objective: To describe the national frequency, prevalence, and trends of discharge against medical advice (DAMA) among inpatient hospitalizations in the United States and identify differences across patient- and hospital-level characteristics, overall and in clinically distinct diagnostic subgroups.

Patients and Methods: We conducted a retrospective, cross-sectional analysis of inpatient hospitalizations ($\geq$18 years), discharged between January 1, 2002, and December 31, 2011, using the Nationwide Inpatient Sample. Descriptive statistics, multivariable logistic, and joinpoint regression were used for statistical analyses.

Results: Between January 1, 2002, and December 31, 2011, more than 338,000 inpatient hospitalizations were discharged against medical advice each year, with a 1.9% average annual increase in prevalence over the decade (95% CI, 0.8%-3.0%). Temporal trends in DAMA varied by principal diagnosis. Among patients hospitalized for mental health- or substance abuse-related disorders, there was a −2.3% (95% CI, −3.8% to −0.8%) average annual decrease in the rate of DAMA. A statistically significant temporal rate change was not observed among hospitalizations for pregnancy-related disorders. Multivariable regression revealed several patient and hospital characteristics as predictors of DAMA, including lack of health insurance (odds ratio [OR], 3.78; 95% CI, 3.62-3.94), male sex (OR, 2.40; 95% CI, 2.36-2.45), and northeast region (OR, 1.91; 95% CI, 1.72-2.11). Other predictors included age, race/ethnicity, income, primary diagnosis, severity of illness, and hospital location/type and size.

Conclusion: Rates for DAMA have increased in the United States, and key differences exist across patient and hospital characteristics. Early identification of vulnerable patients and preventive measures such as improved patient-provider communication may reduce DAMA.

© 2017 Mayo Foundation for Medical Education and Research ■ Mayo Clin Proc. 2017;■■(■):1-11

Discharge against medical advice (DAMA), or patient refusal of continued care,[1] is a global health care[2-9] and public health concern. Approximately 1% to 2% of all hospital discharges in the United States are against medical advice (AMA).[10-12] Compared with conventionally discharged patients, AMA discharges are likely to leave with deficient care, thereby increasing their risk of hospital readmission, morbidity, and mortality.[12-16] Discharge against medical advice also imposes an increased burden on the health care system through disruption of patient care,[12,15] disproportionate consumption of resources,[17] and challenges to providers' ethical obligations.[18]

Despite extensive research on this topic, there are a limited number of studies that have comprehensively examined national DAMA-associated rates, temporal trends, and predictors. Previous research has either been disease-specific (eg, myocardial infarction)[13,19] or focused on distinct settings (eg, trauma centers).[10,15,16,20] Moreover, DAMA research on patients with mental health and substance abuse disorders has been largely based on data from psychiatric settings,[21] with only a few using national data from general community hospital settings.[22,23] Similarly, research on DAMA among pregnancy-related hospitalizations is scant,[24-26] mainly due to their exclusion from large inpatient population analyses.[11] Therefore, although evidence suggests that patients hospitalized for mental health-, substance abuse-, and pregnancy-related disorders are at increased risk for DAMA,[22-26] gaps exist in understanding potential differences in predictive factors

From the Department of Family and Community Medicine, Baylor College of Medicine, Houston, TX.

within these disparate diagnostic subgroups. In this study, we describe the frequency, prevalence, and 10-year temporal trends of DAMA among inpatient hospitalizations in the United States, as well as identify patient- and hospital-level characteristics associated with DAMA, both overall and in several clinically distinct diagnostic subgroups.

PATIENTS AND METHODS

Study Design and Data Source
We conducted a retrospective, cross-sectional analysis of data from the Nationwide Inpatient Sample (NIS) from between January 1, 2002, and December 31, 2011. Developed for the Healthcare Cost and Utilization Project (HCUP), and sponsored by the Agency for Healthcare Research and Quality, the NIS is the largest all-payer, publicly available database of inpatient hospitalization stays in the United States.[27] With clinical and nonclinical data from more than 7 million hospitalizations annually (35 million weighted), it approximates a 20% stratified sample of all US nonfederal, nonrehabilitation, short-term community hospitals.[27] Each year, HCUP hospitals are stratified by bed size, ownership, teaching status, urban/rural location, and US Census Bureau geographic region. The 2-stage cluster sampling design for the NIS data set includes hospitals as the primary sampling units, and then all discharges from the selected hospitals.[27,28] This study was deemed exempt by the Baylor College of Medicine Institutional Review Board.

Study Population and Measures
The study population comprised inpatient hospitalizations among adult ($\geq$18 years) men and women who were discharged AMA. From these, we excluded records for those who died before discharge, and with missing data on discharge disposition or principal diagnosis; missingness was less than 1.5% for these variables. Considering the heterogeneity across all inpatient discharges, a hierarchical methodology was devised to classify the study population into mutually exclusive diagnostic subgroups. Principal diagnoses were identified using single-level Agency for Healthcare Research and Quality-developed Clinical Classifications Software—which classifies more than 14,000

International Classification of Diseases, 9th Edition, Clinical Modification diagnosis codes into smaller, clinically meaningful categories.[29] These Clinical Classifications Software codes were then used to create 3 diagnostic subgroups. First, the "maternal" subgroup was identified by flagging hospitalizations among females with a major diagnostic category of 14 ("pregnancy, childbirth, and the puerperium") and those in which an HCUP-created neonatal-maternal (NEOMAT) variable reflected maternal diagnoses and procedures. Then, the "mental health/substance abuse" (MH/SA) subgroup was created to comprise nonmaternal admissions with a principal diagnosis of alcohol-, substance-, or mood-related disorders. Discharges not meeting the diagnostic criteria for the 2 above-mentioned groups were then included in the subgroup labeled "other."

The primary outcome of interest was DAMA. Patient-level covariates of interest included age, sex, race/ethnicity, income, severity of illness, primary payer/insurance, admission day, and length of stay. Hospital-level covariates such as region, urban/rural location, teaching status, and bed size were also considered. The Table presents the categorization of each variable.

Statistical Analyses
The SAS program, version 9.4 (SAS Institute), and the Joinpoint Regression (JPR) program, version 4.1.1.1, were used to perform statistical analyses. A 5% type I error rate was assumed for all hypothesis tests (2-sided) and construction of CIs. The HCUP-supplied NIS discharge-level and trend weights were incorporated to account for the complex sampling design, ensure consistency in the trend analyses, and produce nationally representative estimates.[28]

Descriptive statistics were derived to estimate the frequency and rate of DAMA, overall and by patient- and hospital-level characteristics. Survey logistic regression was used to assess the associations between covariates and DAMA. Results from the multivariable regression models, adjusting for patient- and hospital-level covariates, were reported as odds ratios (ORs) with 95% CIs. We identified the principal diagnoses contributing to the largest burden of DAMA by ranking diagnoses according to the frequency of DAMA. To