

Patients who leave the emergency department against medical advice

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Objective Discharge against medical advice (DAMA) from the emergency department (ED) accounts for 0.1% to 2.7% of all ED discharges. DAMA carries a risk of increased mortality and readmissions. Our aim was to investigate the general characteristics of DAMA patients and the differences between them and non-DAMA patients.

Methods We reviewed data collected by the National Emergency Medical Center between 2010 and 2011. Subjects were categorized into 2 groups, namely, the DAMA group and the non-DAMA group. We compared these groups with respect to age, gender, trauma or non-trauma status, type of hospital, health insurance, level of consciousness on admission, and diagnosis.

Results Of 8,000,529 patients, 222,389 (2.78%) left against medical advice. The risk factors for DAMA across all age groups were as follows: no medical insurance (odds ratio [OR], 1.993), initial response to voice (OR, 2.753) or pain (OR, 2.101), trauma admission (OR, 1.126), admission to a local emergency medical center (OR, 1.215), and increased age. A high risk of DAMA was observed among patients with immune, endocrine, psychiatric, neurological, circulatory diseases, and external causes of morbidity and mortality.

Conclusion Although DAMA cases account for only a small percentage of hospital discharges, they are important because DAMA patients have high readmission and mortality rates. It is therefore important to understand the general characteristics and predictors of DAMA in order to improve patient outcome and minimize the economic burden on the healthcare system.

Keywords Organization and administration; Emergency service, hospital; Patient discharge

eISSN: 2383-4625

Received: 6 January 2016

Revised: 23 April 2016

Accepted: 1 May 2016

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How to cite this article:

Lee CA, Cho JP, Choi SC, Kim HH, Park JO.
Patients who leave the emergency
department against medical advice. Clin Exp
Emerg Med 2016;3(2):88-94.

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Capsule Summary

What is already known

Discharge against medical advice carries a risk of increased mortality and readmissions.

What is new in the current study

It is important to understand the general characteristics and predictors of discharge against medical advice and utilize them as a basis for improving patient outcomes and minimizing the economic burden.

INTRODUCTION

Emergency departments (EDs) provide acute medical care and decisions to admit or discharge a patient are made within limited time constraints. At times, patients refuse medication, further evaluation, or hospital admission against medical advice. Reasons include conflict with staff, dissatisfaction with hospital care, a past medical history of substance abuse, inability to pay hospital expenses, psychiatric problems, conflicts between carers and patients, lack of significant clinical improvement, beliefs in traditional medicine, long waiting periods, and patients' place of residence.¹⁻⁶ Cases where patients leave the hospital against medical advice are referred to as discharge against medical advice (DAMA).

DAMA from the ED accounts for 0.1% to 2.7% of all discharges⁶⁻⁹ and does carry potential risks. Some studies have reported that DAMA can increase the risk of mortality and of hospital readmission.^{1,4,6,10-12} Baptist et al.¹ showed that DAMA patients with asthma had a higher risk of readmission, and Fiscella et al.⁴ found a high rate of mortality among DAMA patients with myocardial infarctions or unstable angina.

The human rights of patients who want to self-discharge and the obligations of doctors to continue medical care are contentious issues.¹³ Cost of hospitalization associated with DAMA are up to 50% greater than those where discharge is authorized by clinicians,¹⁴ and health care providers are confronted with ethical and legal difficulties, in addition to the increased burden on public health resources.¹³

Many studies have identified the prevalence and risks of DAMA, however, the DAMA rate remains unchanged. The aim of the present study was to determine the characteristics of patients who were discharged against medical advice from the ED in Korea to help reduce poor outcomes and the economic burden.

METHODS

Design and setting

A cross-sectional retrospective study was conducted. This study included admissions to the ED in 138 sentinel hospitals from January 2010 to December 2011. We reviewed data from the National Emergency Department Information System (NEDIS), which is controlled by the National Emergency Medical Center. The NEDIS is a computerized system that tracks the progress of ED patients from their arrival to treatment, and enables data to be updated in near-real time.¹⁵

The NEDIS dataset includes the type of hospital and patient gender, age, and level of consciousness upon arrival, type of health insurance, trauma or non-trauma status, diagnosis, and patient

outcome. The hospital system is divided into 3 levels, namely, 16 regional emergency medical centers (REMCs), 118 local emergency medical centers (LEMCs), and 4 specialty care centers (SCCs). One REMC is allocated to each metropolitan city or province according to the distribution of the medical infrastructure, demographics, and population. General hospitals within a geographical area may be designated as a REMC. A LEMC is established by the governor or mayor to provide local people with access to the medical facilities and services according to the Emergency Medical Service Law. The LEMCs are distributed as follows: one center per 1 million people in metropolitan and major cities, and one center per 0.5 million people at the provincial level. A SCC status is assigned by the Minister for Health, Welfare and Family Affairs to general hospitals with the approval of governors and mayors. SCCs treat patients with trauma or burns or who are under the influence of poisonous substances.¹⁵

The DAMA cases were extracted from the disposition variables after the ED treatment. The AVPU (alert-verbal-painful-unresponsive) scale was used to determine the patient's level of consciousness. Insurance policies were classified into Medicare, Medicaid, auto insurance, workers' compensation insurance, private insurance, self-pay, and other types of insurance. Diagnoses were categorized into 22 chapters based on the international statistical classification of diseases and related health problems 10th revision (ICD-10).¹⁶ Admissions for non-medical purposes, such as the issuing of certificates and records were excluded.

DAMA vs. non-DAMA patients

Subjects were categorized into 2 groups, namely, the DAMA group and the non-DAMA group. We compared these groups with respect to age, gender, trauma or non-trauma status, type of hospital, insurance, initial level of consciousness, and diagnosis.

As SCCs are referral hospitals for specialty care, most patients visit with the thought of admission and further work up. Therefore, we did not count DAMA rates from SCCs according to hospital type. Insurance status was classified as the presence (self-pay) or absence of medical insurance. To analyze the factors affecting DAMA, subjects were stratified into the following age groups: the pediatric group (18 years or younger), the youth and middle-aged group (19 to 64 years of age), and the aged group (65 years and above).

Statistical analysis

Statistical analysis was conducted using IBM SPSS ver. 19.0 (IBM Corp., Armonk, NY, USA). Descriptive analyses were performed to evaluate the general characteristics of the patients. Student's t-tests were used to compare the ages between the DAMA group

and the non-DAMA group. Chi-square tests were used to analyze categorical variables, such as patient gender, type of hospital, insurance status and initial level of consciousness. A multiple logistic regression analysis was performed to determine independent predictors of DAMA according to age group. We constructed a multivariate model using variables selected from the univariate analysis, including gender, insurance status, trauma, initial mental state, the type of hospital, and the diagnosis group by the ICD-10 chapter.

RESULTS

General characteristics

A total of 8,352,652 cases were registered in the NEDIS dataset from 2010 to 2011. Of these, 8,000,529 cases were chosen for further analysis. Patients who visited LEMCs accounted for 80.40% of the total, while those who visited REMCs accounted for 15.26%. The median age was 35.15 years and, 4,264,701 (53.31%) subjects were male. The number of patients who left against medical advice was 222,389 (2.78%). The number of trauma patients was 2,219,641, accounting for 27.74% of the total. A total of 7,750,478

(96.87%) patients were alert when they visited the medical center. We identified 5,577,472 (69.71%) patients who were discharged following successful treatment in the emergency room while 1,698,129 (21.23%) patients were admitted for further investigations or treatment (Table 1).

Comparison between the DAMA and Non-DAMA patients

Table 2 presents the characteristics of the DAMA and non-DAMA patients. The mean age of patients in the DAMA group (43.84 ± 23.01 years) was significantly higher than that of patients in the non-DAMA group (34.75 ± 25.47 years). The univariate analysis revealed a statistically significant correlation between the rate of DAMA and the following variables: male gender ($P < 0.001$), self-pay status ($P < 0.001$), admission to a local emergency medical center ($P < 0.001$), and trauma admission ($P < 0.001$). The male rate among DAMA patients was 54.98%, which is 1.072-fold higher than that among non-DAMA patients (53.26%). Trauma patients self-discharged at a rate 1.126-fold higher than that of non-DAMA patients, at a rate of 30.11%. There were more DAMA cases at LEMCs than at REMCs (unadjusted odds ratio [OR], 1.215). High rates of DAMA were observed among patients without medi-

Table 1. General characteristics of patients attending the emergency department between 2010 and 2011

Characteristics	Value
All patients	8,000,529 (100.00)
Age (yr)	35.00 \pm 25.45
Gender	Male
	4,264,701 (53.31)
Insurance	National health insurance
	7,037,411 (87.96)
	National medical aid
	405,598 (5.07)
	Auto insurance
	319,753 (4.00)
	Workers' compensation insurance
	25,045 (0.31)
	Private
	2,250 (0.03)
	Self-pay
	165,796 (2.07)
	Others
	44,676 (0.56)
Disposition	Discharge following recovery
	5,577,472 (69.71)
	Discharge on grounds of medical futility
	4,293 (0.05)
	Other discharge
	321,484 (4.02)
	Transfer to other hospital for further management
	50,497 (0.63)
	Transfer to other hospital for conservative care
	72,013 (0.90)
	Transfer to other hospital for other reason
	8,286 (0.10)
	Hospitalization
	1,698,129 (21.23)
	Death
	45,966 (0.57)
	Discharge against medical advice
	222,389 (2.78)
Trauma	Disease (non-trauma)
	5,780,888 (72.26)
	Trauma
	2,219,641 (27.74)
Initial level of consciousness	Alert
	7,750,478 (96.87)
	Responds to voice
	109,645 (1.37)
	Responds to pain
	78,881 (0.99)
	Unresponsive
	61,525 (0.77)
Type of center	Regional emergency medical centers
	1,221,006 (15.26)
	Local emergency medical centers
	6,432,224 (80.40)
	Specialty care centers
	347,299 (4.34)

Values are presented as number (%) or mean \pm standard deviation.

Table 2. Comparison of DAMA and non-DAMA

Characteristics	DAMA (n = 222,389)	Non-DAMA (n = 7,778,140)	Unadjusted OR	95% CI
Age (yr)	43.84 ± 23.10	34.75 ± 25.47		
Gender			1.072	1.063–1.081
Male	122,267 (54.98)	4,142,434 (53.26)		
Female	100,122 (45.02)	3,635,706 (46.74)		
Trauma			1.126	1.115–1.136
Yes	66,951 (30.11)	2,152,690 (27.68)		
No (disease)	155,438 (69.89)	5,625,450 (72.32)		
Type of hospital ^{a)}			1.215	1.200–1.230
Local emergency medical centers	185,401 (86.43)	6,246,823 (83.98)		
Regional emergency medical centers	29,115 (13.57)	1,191,891 (16.02)		
Status of insurance			1.993	1.950–2.037
Absence (self-pay)	8,772 (3.94)	157,024 (2.02)		
Presence	213,617 (96.06)	7,621,116 (97.98)		
Initial level of consciousness				
Alert	209,638 (94.27)	7,540,840 (96.95)		
Responds to voice	7,795 (3.51)	101,850 (1.31)	2.753	2.689–2.818
Responds to pain	4,354 (1.96)	74,527 (0.96)	2.101	2.038–2.167
Unconscious	602 (0.27)	60,923 (0.78)	0.355	0.328–0.385
Diagnosis (by ICD chapter)				
Certain infectious and parasitic diseases (A00–B99)	11,746 (5.28)	694,258 (8.93)	0.569	0.558–0.580
Neoplasms (C00–D48)	5,562 (2.50)	259,330 (3.33)	0.744	0.724–0.764
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50–D89)	1,194 (0.54)	30,781 (0.40)	1.359	1.282–1.440
Endocrine, nutritional and metabolic diseases (E00–E90)	6,356 (2.86)	105,682 (1.36)	2.136	2.082–2.192
Mental and behavioral disorders (F00–F99)	11,730 (5.27)	108,679 (1.40)	3.929	3.853–4.007
Diseases of the nervous system (G00–G99)	7,056 (3.17)	153,730 (1.98)	1.625	1.586–1.665
Diseases of the eye and adnexa (H00–H59)	1,562 (0.70)	99,260 (1.28)	0.547	0.520–0.575
Diseases of the ear and mastoid process (H60–H95)	2,461 (1.11)	160,558 (2.06)	0.531	0.510–0.553
Diseases of the circulatory system (I00–I99)	13,647 (6.14)	339,019 (4.36)	1.435	1.409–1.460
Diseases of the respiratory system (J00–J99)	13,574 (6.10)	1,038,625 (13.35)	0.422	0.414–0.429
Diseases of the digestive system (K00–K93)	19,596 (8.81)	706,824 (9.09)	0.967	0.952–0.981
Diseases of the skin and subcutaneous tissue (L00–L99)	2,650 (1.19)	230,445 (2.96)	0.395	0.380–0.411
Diseases of the musculoskeletal system and connective tissue (M00–M99)	5,162 (2.32)	198,925 (2.56)	0.905	0.880–0.931
Diseases of the genitourinary system (N00–N99)	6,890 (3.10)	303,558 (3.90)	0.787	0.768–0.807
Pregnancy, childbirth and the puerperium (O00–O99)	576 (0.26)	31,582 (0.41)	0.637	0.587–0.692
Certain conditions originating in the perinatal period (P00–P96)	289 (0.13)	12,912 (0.17)	0.782	0.696–0.880
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	258 (0.12)	8,527 (0.11)	1.058	0.935–1.198
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00–R99)	49,909 (22.44)	1,122,888 (14.44)	1.715	1.698–1.733
Injury, poisoning and certain other consequences of external causes (S00–T98)	58,258 (26.20)	2,037,890 (26.20)	1.000	0.990–1.009
External causes of morbidity and mortality (V01–Y98)	1,893 (0.85)	45,433 (0.58)	1.461	1.395–1.530
Factors influencing health status and contact with health services (Z00–Z99)	2,020 (0.91)	89,234 (1.15)	0.790	0.756–0.826

Values are presented as mean ± standard deviation or number (%).

DAMA, discharge against medical advice; OR, odds ratio; CI, confidence interval; ICD, international statistical classification of diseases and related health problems.

^{a)}Subjects from specialty care centers were excluded.

cal insurance. The DAMA rate was higher in patients who were responsive to pain or voice on admission to the ED than in those who were alert. In cases categorized as ICD-10 chapter 3, 4, 5, 6, 9, 18, and 20 diseases, the DAMA rate was significantly higher, particularly amongst patients with mental and behavioral disorders (chapter 5).

The confounding factors of gender, trauma, type of hospital, status of medical insurance, initial level of consciousness and di-

agnosis group were adjusted according to age groups. Self-pay status (adjusted OR [aOR], 1.573), LEMC admission (aOR, 1.327), trauma admission (aOR, 1.183), response to voice (aOR, 1.722) and pain (aOR, 1.381), and ICD-10 chapter 4, 5, 6, 9, 11, 13, 14, 15, 16, 17, 18, 19, 20 diseases were predictors of DAMA in the pediatrics group. In the youth and the middle-aged group, male gender (aOR, 1.201), self-pay (aOR, 1.836), LEMC admission (aOR, 1.251), trauma admission (aOR, 1.307), initial response to voice

Table 3. Results from multivariable modeling for predictors of discharge against medical advice by age group

Characteristics	The pediatric group (n = 2,481,727)		The youth and the middle-aged group (n = 3,968,009)		The aged group (n = 1,203,494)	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Gender, male	1.014	0.992–1.037	1.201	1.188–1.215	1.093	1.073–1.114
Self-pay	1.573	1.457–1.698	1.836	1.790–1.883	1.041	0.959–1.130
Local emergency medical centers	1.327	1.284–1.372	1.251	1.231–1.271	1.241	1.210–1.273
Trauma (non-disease)	1.183	1.128–1.241	1.307	1.280–1.333	1.098	1.055–1.144
Initial level of consciousness, alert						
Responds to voice	1.722	1.533–1.934	2.272	2.201–2.345	1.262	1.210–1.316
Responds to pain	1.381	1.197–1.592	1.569	1.504–1.638	1.060	1.006–1.117
Unconscious	0.420	0.287–0.615	0.269	0.242–0.300	0.150	0.132–0.171
Diagnosis						
Certain infectious and parasitic diseases (A00–B99)	1.022	0.902–1.157	0.911	0.859–0.965	1.018	0.891–1.164
Neoplasms (C00–D48)	0.955	0.751–1.214	0.864	0.809–0.922	0.919	0.807–1.048
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50–D89)	1.218	0.964–1.539	1.820	1.649–2.009	2.119	1.813–2.476
Endocrine, nutritional and metabolic diseases (E00–E90)	1.739	1.379–2.193	2.238	2.095–2.390	2.256	1.982–2.567
Mental and behavioral disorders (F00–F99)	8.577	7.445–9.881	4.085	3.859–4.324	2.303	2.006–2.642
Diseases of the nervous system (G00–G99)	3.474	3.029–3.983	1.805	1.698–1.919	1.837	1.606–2.101
Diseases of the eye and adnexa (H00–H59)	1.021	0.861–1.212	0.593	0.547–0.642	0.904	0.748–1.093
Diseases of the ear and mastoid process (H60–H95)	0.689	0.594–0.800	0.848	0.786–0.915	1.066	0.919–1.236
Diseases of the circulatory system (I00–I99)	2.748	2.319–3.257	1.692	1.597–1.794	1.377	1.213–1.564
Diseases of the respiratory system (J00–J99)	0.878	0.777–0.993	0.709	0.668–0.753	1.168	1.026–1.331
Diseases of the digestive system (K00–K93)	1.153	1.014–1.311	1.316	1.245–1.391	1.079	0.949–1.227
Diseases of the skin and subcutaneous tissue (L00–L99)	0.825	0.717–0.949	0.523	0.487–0.562	0.720	0.606–0.855
Diseases of the musculoskeletal system and connective tissue (M00–M99)	1.582	1.360–1.840	0.958	0.900–1.019	1.171	1.021–1.343
Diseases of the genitourinary system (N00–N99)	1.544	1.329–1.795	0.915	0.862–0.972	0.966	0.844–1.105
Pregnancy, childbirth and the puerperium (O00–O99)	3.005	1.935–4.670	0.777	0.703–0.860	1.548	0.754–3.175
Certain conditions originating in the perinatal period (P00–P96)	2.141	1.793–2.557	1.143	0.791–1.652	2.342	1.544–3.551
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	3.727	3.044–4.562	1.138	0.909–1.425	0.950	0.585–1.542
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00–R99)	2.237	1.981–2.527	1.976	1.872–2.086	2.060	1.817–2.337
Injury, poisoning and certain other consequences of external causes (S00–T98)	1.421	1.257–1.607	1.013	0.960–1.070	1.200	1.055–1.365
External causes of morbidity and mortality (V01–Y98)	1.343	1.095–1.648	1.447	1.343–1.558	1.336	1.109–1.611

OR, odds ratio; CI, confidence interval.

(aOR, 2.272) and pain (aOR, 1.569), and ICD-10 chapter 3, 4, 5, 6, 9, 11, 18, 20 diseases were found to be predictors of DAMA. Among the aged group, male gender (aOR, 1.093), LEMC admission (aOR, 1.241), trauma admission (aOR, 1.098), initial response to voice (aOR, 1.262) and pain (aOR, 1.060), and ICD-10 chapter 3, 4, 5, 6, 9, 10, 13, 18, 19, 20 diseases were found to be predictors of DAMA (Table 3).

DISCUSSION

Patient complaints about poor communication with health professionals or the high costs of hospitalization are well recognized in clinical practice. Some patients believe that their health improves following admission to hospital, whereas others are dissatisfied with their treatment. For a number of reasons, patients

return home against medical advice despite the high risks of re-admission and mortality. The DAMA rate in EDs is approximately 1% to 2% of admissions, which is similar to the DAMA rate in hospitalized patients.^{3,8,17-20}

The current study reveals that the incidence of DAMA and the higher prevalence among males are comparable to statistics reported in the literature. The mean age of DAMA patients in Korea (43.84 years) was similar to that in other countries; however, the mean age of non-DAMA patients was significantly younger than that in previous reports.^{3,13,18,21}

Subjects were divided into three groups according to their age. The discharge of pediatric patients is usually determined by their parents, while in aged patients, discharge is generally influenced by their caregivers. Accordingly, DAMA factors were analyzed according to age group.

Trauma, hospital type, status of insurance, and initial level of consciousness influenced DAMA rates across all age groups. The current study showed that the DAMA rate among patients admitted with trauma was higher than that among patients with non-traumatic medical conditions. Many studies have indicated that alcohol or drug abuse is a predictor of both DAMA and injury.²² DAMA in injured patients is thought to be influenced by alcohol consumption. Duffy²³ found that patients admitted to rural hospitals were more likely to leave against medical advice than patients admitted to urban hospitals. This is consistent with our finding that the DAMA rate in LEMCs was higher than that in REMCs as every REMC in Korea is located in an urban area. The inability to pay for hospital expenses is one important reason for leaving an ED and is the most common cause of the high DAMA rate among patients without insurance.^{6,21,24,25} There were more DAMA cases among patients who responded to verbal or painful stimuli compared with those who were mentally alert. We speculate that people under the influence of alcohol or drugs became conscious as time passed.

An important characteristic of this study is that we analyzed the distribution of DAMA cases according to the ICD-10 diagnosis codes. In ICD-10 chapters 4, 5, 6, 9, 18, and 20, the DAMA ratio was high in all age groups. Chapters 4 and 6 were endocrine, nutritional, and metabolic diseases (ICD-10 code, E00-E90) and diseases of the nervous system (ICD-10 code, with G00-G99). We postulated that patients with chronic diseases refused to remain in hospital for a long time. Patients with mental and behavioral disorders (ICD-10 code, F00-F99; chapter 5) had the highest risk of DAMA, which is consistent with previous studies.⁹ In the pediatric group, the DAMA rate was 8.577 times higher, which was significantly high. Additionally, diseases of the circulatory system (ICD-10 code, I00-I99; chapter 9) were associated with a high risk of DAMA, consistent with previous studies.⁴

Interestingly, chapter 18 (symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; ICD-10 code, R00-R99) and chapter 20 (external causes of morbidity and mortality; ICD-10 code, V01-Y98) were also associated with a high risk of DAMA. The variable of diagnoses is based on the first impression by physicians. Sometimes physicians record patients' diagnoses before they have completed work-ups. In these cases, ICD codes are recorded as R00-R00 or V01-Y98 based only on symptoms, signs, and injury causes. According to one study, intentional injuries (ICD 10 code, X60-Y34) are closely associated with DAMA.²⁶ Complications of medical and surgical care (ICD 10 code, Y40-Y84) influence patient satisfaction with treatment. We postulated that the DAMA rate in ICD-10 chapter 20 is related to injuries and complications.

Some ICD-10 chapter groups showed high DAMA rates in a

specific age group, not in all age groups. The aged group with diseases of the respiratory system (ICD-10 code, J00-J99; chapter 10) showed a high DAMA rate (aOR, 1.168) compared to the pediatric and the youth and middle-aged groups. This is because many aged patients have chronic respiratory disease which, as with other chronic conditions, is associated with an increased DAMA rate. The DAMA rate in the pediatric patients with congenital malformations, deformities and chromosomal abnormalities (ICD-10 code, Q00-Q99; chapter 17) is high (aOR, 3.727) because parents who have taken care of their infants for a long period of time are less likely to comply with doctors' directions.

This study has the strength of a large-scale investigation overseen by a national organization. We successfully obtained objective data minimizing any bias associated with single center studies. Nonetheless, this study has two main limitations. Firstly, it identifies patients who left the ED against medical advice on the basis of a final diagnosis and a limited set of administrative data. We need more information to explain why patients leave, how DAMA can be prevented, and whether there are any negative outcomes for these patients. Secondly, we used only one primary diagnosis, even though patients may have two or more diagnoses. For example, trauma injuries can be classified according to the mechanism of injury or its effect. Our registry did not prioritize between mechanisms and results. Therefore, this study showed that chapter 19 diagnoses (ICD-10 code, S00-T98) are not related to DAMA, while trauma was a predictor of DAMA.

Furthermore, the chapter classification based on the ICD-10 code is not specific enough for individual diseases. A more detailed classification by disease may be necessary to further characterize DAMA factors. Finally, to predict DAMA using our logistic regression analysis model, external validation with the NEDIS dataset, over another year, is required.

In conclusion, we identified the general characteristics of DAMA patients and differences between the DAMA and non-DAMA groups. The risk factors for DAMA across all age groups were self-pay status (no insurance), response to voice or pain, trauma, admission at a local emergency medical center, and older age. According to the ICD-10 disease groups, there is a high risk of DAMA among patients who have immune, endocrine, psychiatric, neurological, circulatory diseases, and external causes of morbidity and mortality. This study will be utilized as a basis for improving patient outcomes and minimizing the economic burden.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGMENTS

We would like to thank the National Emergency Medical Center for providing the data in this study.

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