

Original Research

Who Left the Hospital Against Medical Advice During the Early COVID-19 Pandemic?

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Abstract

Background

Patients leaving against medical advice (AMA) presents a challenge to hospitals as they try to manage costs and improve patient outcomes in an ever-increasing competitive market. Investigating AMA discharges that occurred during the early COVID-19 pandemic presents a unique opportunity to better understand this phenomenon and be better prepared for the future.

Methods

This retrospective analysis of 34 379 patients from a nationwide private healthcare system across 20 states analyzed patients during the early stages of the pandemic who chose to leave against medical advice (AMA) after being admitted with COVID-19 infection and identified several patient characteristics associated with subsequent AMA discharge.

Results

These patient characteristics included being younger than 50; identifying as male sex; having non-white ethnicity, including both Black and Hispanic; having either Medicaid or no health insurance; and the presence of specific medical comorbidities. The identified medical comorbidities were substance abuse, renal failure, deep vein thrombosis, hypertension with heart failure, hypertension with chronic kidney disease stage 5, rheumatoid arthritis or collagen vascular diseases, alcohol abuse, chronic pulmonary disease, hypertensive encephalopathy, and solid tumor.

Conclusion

This study confirms some of the findings in previous studies looking at AMA discharges and has some interesting findings as it relates specifically to the COVID-19-infected patient population. An additional understanding of the factors leading to AMA discharges can help providers and administrators prevent suboptimal discharge outcomes in the future.

Keywords

patient care; patient discharge; hospitalization; treatment refusal; treatment refusal/trends; social determinants of health; COVID-19; SARS-CoV-2; AMA discharge

Introduction

Patients who decide to leave against medical advice (AMA) have consistently been shown to represent between 1 and 2% of all medical discharges.¹ AMA discharges have been studied previously in different patient populations and have been shown to have associated risks, including increased morbidity, mortality, re-admission rates, and economic impact on hospitals.¹⁻⁴ Previous studies looking at AMA

discharges for those infected with the novel coronavirus disease 2019 (COVID-19) during the pandemic have been limited, with the authors only able to identify 1 previous study to date that looked only at patients with acute coronary syndrome.⁵ In an ever-increasing environment of limited resources and the need for improved clinical outcomes, the advantages gained through increasing our understanding of risk factors that help predict which patients

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are more likely to leave AMA may provide competitive advantages in operational efficiency between competing healthcare systems. This study looked at a large cohort of COVID-19-infected patients to better understand what patient characteristics, including demographic and clinical variables, were associated with an increased likelihood of leaving AMA during the global pandemic.

Methods

Study Design and Population

This cross-sectional study evaluated the AMA discharge group among inpatients over 18 years old admitted with symptomatic COVID-19 in a nationwide private healthcare system from January 1, 2020, to September 1, 2020. The inclusion criteria for this study were symptomatic adult patients with age greater than 18 years old; severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) positive test by polymerase chain reaction testing; and admission to inpatient units with a discharge diagnosis of COVID-19 across the healthcare system from January 1, 2020, to September 1, 2020. Exclusion criteria included patients who were discharged home from the emergency room and patients who were admitted to a children's hospital. Data were collected from electronic health records in a data warehouse of the healthcare system across 20 states. This research activity was determined to be exempt or excluded from Institutional Review Board (IRB) oversight per current regulations and institutional policy with a reference number of 2020-472.

Demographic and Clinical Characteristics

The demographic variables included age, sex, race, ethnicity, body mass index, and type of medical insurance. Clinical variables included medical comorbidities, the initial location of admission, the need for mechanical ventilation, length of hospital stay, and medications prescribed during the stay. Medication classes assessed included corticosteroids, anticoagulants, antiplatelets, gastrointestinal protectants, IV fluid, statins, zinc sulfate, vitamin C, azithromycin, hydroxychloroquine, and remdesivir.

Data Analysis

The t-test, Kruskal-Wallis test, chi-square test, and Fisher's exact test were used for demographic and clinical descriptive statistics. Data tools were selected based on the types of variables and standard distribution patterns. A stepwise logistic regression model was used to evaluate significant relationships between independent variables and the outcome variables of AMA discharge. A *P* value of less than .05 was considered significant. Analyses were performed using STATA 17 (StataCorp, College Station, TX).

Results

Of the 34 379 (1.35%) patients in the retrospective analysis, 469 had AMA discharges. The mean length of stay for the AMA group was 4.2 ± 6.3 days compared to 8.8 ± 9.1 days in the overall COVID-19-infected group. The group with AMA discharges were younger and male (49.6 ± 16.6 vs 61.8 ± 17.7 years old, *P* = .0001 and 62.7% vs 52.0%, *P* < .0001). Other demographic and clinical characteristics are summarized in **Table 1**. Logistic regression of demographic variables, comorbidities, and initial medications with dependent variables of AMA discharge are illustrated in **Table 2**. The AMA discharge rate among COVID-19 patients does not appear to differ from the rates reported among different patient populations in prior studies.¹⁻⁴ Patient characteristics associated with AMA discharge included younger male, Black race, Hispanic ethnicity, Medicaid or no insurance, and the presence of specific medical comorbidities such as substance abuse, renal failure, deep vein thrombosis, hypertension with heart failure, hypertension with chronic kidney disease stage 5 (CKD 5), rheumatoid arthritis or collagen vascular diseases, alcohol abuse, chronic pulmonary disease, hypertensive encephalopathy, and solid tumor. The markers for the increased severity of the disease included mechanical ventilation and treatment with dexamethasone. The increased number of medical comorbidities was associated with decreased odds of AMA discharge.

Limitations

This study is limited to retrospective analysis and by potential non-differential bias due to

Table 1. Demographic and Clinical Characteristics of COVID-19 Patients With and Without AMA Discharges

Variable	Total (N = 34 845)	No AMA group (n = 34 376)	AMA group (n = 469)	P value
Age (Mean +/- SD)	61.82 ± 17.67	61.98 ± 17.62	49.56 ± 16.63	<.0001
Sex, Male (%)	18 111 (51.98)	17 817 (51.83)	294 (62.69)	<.0001
Body mass index (Mean +/- SD)	30.84 ± 8.64	30.84 ± 8.63	30.85 ± 8.94	.993
Race (%)				<.0001
Black	7664 (21.99)	7501 (21.82)	163 (34.75)	
Other	9118 (26.17)	9022 (26.25)	96 (20.47)	
White	18 063 (51.84)	17 853 (51.93)	210 (44.78)	
Ethnicity (%)				<.0001
Hispanic	12 078 (34.46)	11 955 (34.78)	123 (26.23)	
Insurance (%)				<.0001
No insurance	621 (1.78)	590 (1.72)	31 (6.61)	
Medicaid	4071 (11.68)	3958 (11.51)	113 (24.09)	
Medicare	17 314 (49.69)	17 184 (49.99)	130 (27.72)	
Other	6535 (18.75)	6414 (18.66)	121 (25.8)	
Private	6304 (18.09)	6230 (18.12)	74 (15.78)	
Admission service (%)				<.0001
General ward	11 385 (32.67)	11 202 (32.59)	183 (39.02)	
Intensive care unit	10 765 (30.89)	10 665 (31.02)	100 (21.32)	
Telemetry and stepdown	8454 (24.26)	8321 (24.21)	133 (28.36)	
Other	4241 (12.17)	4188 (12.28)	53 (11.3)	
Number of comorbidities (Mean +/- SD)	4.61 ± 3.08	4.61 ± 3.08	3.87 ± 2.62	<.0001
Need for mechanical ventilation (%)	4530 (13)	4511 (13.12)	19 (4.05)	<.0001
Length of stay in days (Mean +/- SD)	8.75 ± 9.14	8.82 ± 9.16	4.24 ± 6.30	<.0001

medical record errors, medical record coding errors, and potential over- or under-documentation of diagnoses or identifiers. The patients' reasons for leaving AMA were not identified or collected. Retrospective studies can only establish an association, and caution should be employed in making claims about cause and effect between risk factors and outcomes.

Discussion

This study validates the findings in previous studies, which show a correlation between AMA discharge and specific patient characteristics, including identifying as male, being of younger age, lacking medical insurance, or having noncommercial health insurance.⁶⁻⁹ This study also identified Hispanic and Black ethnicity as showing an increased correlation for AMA

discharge, which is consistent with previous findings for Black patients but contradicts previous studies looking at race and ethnicity as it relates to Hispanic ethnicity.^{10,11} Studies examining individual and hospital socioeconomic class have shown significant correlations between lower socioeconomic class and AMA discharge and argue against the previously reported associations between race, ethnicity, and AMA discharges.^{11,12} Previous studies have shown that more than 40% of patients who left AMA cited a lack of resources as the main reason, and upward of 85% identified they had to leave because they were self-paying.¹³ Studies looking at populations with universal health-care have shown similar AMA discharge rates and further support that the decision to leave AMA is not easily attributed to a lack of health-

Table 2. Odds Ratio Estimates for Discharge Against Medical Advice

Independent variables	Odds ratio	P value	95% confidence limits	
Age	0.973	>.001	0.963	0.983
Male gender	1.606	.001	1.216	2.121
Body mass index	0.978	.014	0.961	0.996
Ethnicity and race				
Hispanic	1.705	.002	1.221	2.383
Black	1.466	.015	1.077	1.994
Insurance compared to private insurance				
Medicaid	2.085	>.001	1.443	3.014
No insurance	2.727	.001	1.530	4.858
Other insurance	1.803	.001	1.278	2.542
Comorbidities				
Substance abuse	5.926	>.001	3.752	9.359
Renal failure	3.211	>.001	1.771	5.822
Deep vein thrombosis	2.859	.008	1.315	6.219
Rheumatoid arthritis or collagen vascular diseases	2.567	.031	1.092	6.030
Hypertension with heart failure	2.462	.005	1.320	4.592
Solid tumor	2.384	.046	1.017	5.588
Hypertension with CKD stage 5	2.234	.021	1.132	4.408
Hypertensive encephalopathy	2.191	.015	1.167	4.116
Alcohol abuse	2.109	.006	1.239	3.591
Chronic pulmonary disease	1.955	>.001	1.376	2.777
No of comorbidity	0.820	>.001	0.751	0.896
Hospital course and medication during hospitalization				
On mechanical ventilation	0.502	.024	0.276	0.913
Dexamethasone	0.652	0.037	0.436	0.974
Subcutaneous heparin	0.537	0.016	0.324	0.889

Abbreviation: CKD = chronic kidney disease

care coverage alone.¹⁴ This study was limited in that it did not evaluate socioeconomic class in the regression analysis.

The type of hospital, including urban hospitals, medium, and large size hospitals, has previously been shown to have a higher risk of AMA, while teaching hospitals have been shown to be linked with lower risk.¹⁰ This study did not evaluate or differentiate between different hospital sizes, settings, or complexity but looked at a heterogenous hospital sampling within a large private hospital system.

With regard to patient characteristics, this study is consistent with previous studies that demonstrated certain associated diseases, including substance abuse, alcohol abuse, and heart failure, are correlated with an increased risk of leaving AMA. Rates of AMA discharge or heart failure patients have been studied in depth and have demonstrated that the most frequent reason for leaving was reluctance to undergo a procedure due to patient-identified concerns or fear.¹⁵ This study did not identify the reason or rationale behind a patient's decision, which remains a critical but less stud-

ied part of a patient's AMA decision-making process.

Identifying solid tumor diagnosis as a risk factor for AMA was surprising, as patients with cancer and other neoplastic diseases were previously shown to be the least likely to be discharged AMA and may represent patient concerns related specifically to the COVID-19 pandemic.¹⁰ The comorbidities of renal failure, deep vein thrombosis, rheumatoid arthritis or vascular collagen diseases, hypertension with CKD 5, hypertensive encephalopathy, and chronic pulmonary disease were also all shown to be associated with an increased risk of AMA discharge. These diagnoses pose varying risks to patients regarding COVID-19 infection. If patients were able to justify continuing treatment and quarantining at home, they may have made well-informed decisions based on patient-driven, well-reasoned decision-making. Without follow-up data on adverse outcomes or hospital re-admission rates, it is difficult to adequately assess the impact of the AMA decision on the studied population.

Conclusion

This study identified medical comorbidities, including renal failure, deep vein thrombosis, rheumatoid arthritis or vascular collagen diseases, hypertension with CKD 5, hypertensive encephalopathy, and chronic pulmonary disease that posed an increased risk of a patient leaving AMA when admitted to a hospital with COVID-19 infection during the pandemic. Understanding the characteristics of patients who leave the hospital AMA and gaining insight into their reasons are essential since resource allocation, delivery of medical care, and quality of care are all potentially affected when patients leave AMA. Prospective data collection and the development of patient surveys to identify why patients choose to leave AMA would be helpful in better understanding this problem. Determining whether the patient is leaving AMA due to a patient applying informed decision-making and exercising personal preference or choosing to leave due to economic concerns or perceived mistreatment would be more helpful to providers and administrators in tackling this long-standing problem. The information gained from well-designed prospective studies may provide

valuable insight into why patients leave and add to the current knowledge on the patient characteristics of who decides to leave. The insight gained through future studies may better yield the understanding providers and administrators need to develop impactful interventions.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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