

Short communication

Discharge against medical advice from hospitalizations for substance use disorders: The potential impact of the Affordable Care Act

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ABSTRACT

Objectives: To explore whether the Affordable Care Act (ACA) enactment is associated with changes in the proportion of discharge against medical advice (DAMA) among hospitalizations due to substance use disorders (SUDs).

Methods: Data were drawn from the 2012–2015 National Inpatient Samples. The sample comprised hospitalizations with a principal diagnosis of SUD (i.e., SUD-involved hospitalization) for patients aged 18–64 years (unweighted N = 287,629). Interrupted time series analyses were conducted to evaluate the effect of the ACA on monthly proportions of DAMA among SUD-involved hospitalizations.

Results: Overall, approximately 11% of SUD-involved hospitalizations were DAMA. DAMA was most frequently found among hospitalizations for primary opioid use disorder (pre-ACA: 16.4%; post-ACA: 17.2%). Despite the increase in the Medicaid coverage after ACA enactment, there was no significant change in the proportion of DAMA before and after ACA periods across various demographic groups and clinical conditions. Time series analyses also indicated no significant trend effect on the proportion of DAMA during the pre- and post-ACA months.

Conclusions: As many as 1 in 10 SUD-involved hospitalizations were considered as DAMA. Concerted efforts are needed to enhance insurance benefits for SUDs and patients' knowledge of SUD treatment benefits in order to increase SUD treatment engagement and completion and to reduce DAMA, especially for substance-using patients with Medicaid or opioid use disorder.

1. Introduction

Notably, substance use disorders (SUDs: alcohol or drug use disorders) is among the most prevalent diagnoses in discharge against medical advice (DAMA) hospitalizations in the United States, with an estimated proportion of 14% (Spooner et al., 2017). DAMA is indicative of the receipt of inadequate treatment for SUD following an episode of SUD problems, which is associated with SUD treatment readmissions and poorer outcomes (Alfandre, 2009; Southern et al., 2012; Wines et al., 2007). However, few studies have focused on DAMA behaviors among patients admitted to SUD treatment, and there is a lack of data using large samples to better characterize DAMA related to drug use disorders (Ti and Ti, 2015). Thus, it is important to study DAMA and its pattern in a large national sample of patients admitted to SUD treatment in order to provide generalizable estimates to inform efforts aimed

at reducing DAMA and improving the linkage to proper specialty treatment or follow-up care.

Furthermore, the Affordable Care Act (ACA) may increase access to SUD treatment and enhance the quality of such treatment for previously uninsured or under-insured SUD patients through expanding coverage and associated SUD benefit of Medicaid expansion and health insurance exchange programs (Abraham et al., 2017; Beronio et al., 2013). Prior to ACA, having Medicaid or no insurance was associated with DAMA in samples of general or detoxification hospitalizations (Blondell et al., 2006; Tawk et al., 2013). Thus, the ACA may potentially improve the uptake for SUD treatment and its treatment length to reduce DAMA. However, to date, there has been no empirical study to examine changes in DAMA among SUD patients after ACA. One study found that, among adults with SUD, the prevalence of Medicaid coverage increased significantly from 11.6% in 2011–2013 to 16.0% in 2014, but there was

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no significant change in the prevalence of SUD treatment utilization (Saloner et al., 2017). Particularly, the United States is amid the opioid epidemic, and there is a need to maximize the benefit of Medicaid expansion to address the opioid epidemic (Humphreys, 2018; Sharp et al., 2018). A detoxification center reported that over half of opioid-using detoxification patients were DAMA (Kenne et al., 2010). It is imperative to investigate DAMA by using national samples to inform intervention needs and strategies for improving SUD treatment engagement for patients at-risk for DAMA, especially for opioid use disorders (OUDs).

To better understand the extent of DAMA within the context of ACA enactment, this study uses a nationally representative inpatient sample to (1) examine the proportions of DAMA among hospitalizations due to SUD before and after ACA periods, and (2) determine the effect of the ACA on the proportions of DAMA.

2. Methods

2.1. Data source

The data were drawn from the National Inpatient Sample (NIS), the Healthcare Cost and Utilization Project (HCUP), sponsored by the Agency for Healthcare Research and Quality (HCUP, 2017). The NIS is a nationally representative sample of inpatient discharges from non-rehabilitation and non-long-term acute care community hospitals. The study period was from January 2012 to September 2015. The fourth quarter of 2015 data was excluded because the conversion from the ICD-9-CM to the ICD-10-CM coding system may create diagnosis discontinuity problems (Heslin et al., 2017).

2.2. Study sample

The unit of analysis is a hospitalization encounter. We focused on the hospitalizations with a principal diagnosis of SUD (i.e., SUD-involved hospitalizations) for patients aged 18–64 years, excluding cases of death in hospital and cases with a missing disposition status or admission month (about 1% of the sample). SUDs (i.e., alcohol or drug use disorders) were identified based on the ICD-9-CM diagnosis codes 291–292 and 303–305 (excluding tobacco use disorder and remission codes). The principal diagnosis was defined as the condition chiefly responsible for the hospital admission. This sample represented a national sample of hospitalizations with patients receiving treatment for substance-related diagnoses in community hospitals (Weiss and Heslin, 2018). The unweighted sample size for this analysis is 287,629.

2.3. Study variables

The primary outcome of this study was the proportion of DAMA among SUD-involved hospitalizations. We identified DAMA hospitalizations as patients whose disposition status was DAMA (i.e., UB-04 billing claim form: left against medical advice or discontinued care). We divided the study period into two intervals to reflect the policy change of the ACA starting in 2014: pre-ACA (January 2012–December 2013) and post-ACA (January 2014–September 2015) periods.

2.4. Statistical analysis

We aggregated the data and calculated the monthly weighted proportion of DAMA among SUD-involved hospitalizations at the national level by considering the NIS's complex sample designs. We had estimated 45-month time-series data on the proportion of DAMA among SUD-involved hospitalizations. Next, we conducted the single-group interrupted time series analysis (ITSA) to evaluate changes in DAMA proportions before and after ACA periods (policy interruption point: January 2014) in the total sample and among selected insurance (Medicaid, private) and SUD diagnosis (alcohol, drug, opioid) subgroups. The ITSA has been commonly used as a quasi-experimental

method to assess the immediate effect of health policies (Bernal et al., 2017; Linden, 2015). Our models included three key predictors: (1) the time elapsed (month); (2) intervention indicator (pre-ACA = 0; post-ACA = 1); and (3) interaction of time and intervention variables. Additionally, the autocorrelation and seasonality of outcome data were checked and adjusted in six models. Stata 15.1 software was used for all estimates (StataCorp, 2017).

3. Results

3.1. Proportion of DAMA before and after the ACA enactment (Supplementary Tables S1 and S2)

From January 2012 to September 2015, approximately 11% of SUD-involved hospitalizations were DAMA, and the annual DAMA proportion was relatively stable over time. Of note, the proportion of Medicaid coverage increased by 10% in the post-ACA years (2015Q1–Q3: 42.1%, 2014: 40.0% vs. 2013: 30.1%, 2012: 31.2%).

About 10.8% and 11.0% of SUD-involved hospitalizations were DAMA in the pre-ACA period and the post-ACA period, respectively. There was no significant change in the proportion of DAMA among SUD-involved hospitalizations before and after ACA periods across demographic and clinical groups. Hospitalizations primarily due to OUD (i.e., OUD-involved hospitalizations) had the highest proportion of DAMA (pre-ACA: 16.4%; post-ACA: 17.2%).

3.2. The effect of the ACA on the proportion of DAMA (Table 1 and Fig. 1)

The results from ITSA models showed that, among SUD-involved hospitalizations (Model 1), the monthly proportion of DAMA had no significant change in the pre-ACA trend, post-ACA trend (relative to the pre-ACA trend). There was no immediate effect of ACA enactment (the value in January 2014 relative to the corresponding predicated value from the pre-ACA trend). Similarly, no significant change related to ACA policy change was observed for the proportion of DAMA among other subgroups (Models 2–5: SUD-involved hospitalizations with Medicaid, private insurance, alcohol use disorder, and drug use disorder). The only significant finding from ITSA models was a significant immediate increase in the proportion of DAMA among OUD-involved hospitalizations in January 2014 (Model 6). However, the comparison of DAMA proportion before and after ACA periods was not significant (no significant difference in the DAMA proportion among OUD-involved hospitalizations between pre- and post-ACA periods). Fig. 1 illustrates the actual and predicated monthly proportions of DAMA among SUD- and OUD-involved hospitalizations from results of ITSA models (Models 1 and 6).

4. Discussion

Patients admitted to the hospital due to SUD diagnosis but leaving hospital against medical advice indicate that opportunities to promote patients' uptake for SUD treatment and retention are missed, thereby increasing the risk for morbidity (Alfandre, 2009; Southern et al., 2012). Hospitalized SUD patients are likely to have a severe medical condition that requires intensive SUD treatment. Their SUD treatment needs thus must be addressed properly. This study analyzed a large nationally representative sample to examine the effect of the ACA on the DAMA proportion from SUD-involved hospitalizations. We found that, despite an increase in Medicaid coverage as payer, there was no significant change in the proportion of DAMA among SUD-involved hospitalizations following the ACA enactment. In addition, DAMA was more prevalent among OUD-involved hospitalizations than other demographic and clinical groups. The ITSA models also indicated no significant trend effect in the proportion of DAMA during the pre- and post-ACA months. These findings reinforce a critical need to improve SUD treatment uptake and retention, especially for patients with OUD,

Table 1
Estimates of interrupted time series models for the monthly proportion of discharge against medical advice (DAMA) among substance use disorder (SUD) involved hospitalizations: National Inpatient Samples, 2012–2015Q3.

Outcomes (%)	Model 1 Proportion of DAMA among SUD-involved hospitalizations	Model 2 Proportion of DAMA among SUD-involved hospitalizations with Medicaid coverage	Model 3 Proportion of DAMA among SUD-involved hospitalizations with private insurance	Model 4 Proportion of DAMA among SUD-involved hospitalizations with alcohol use disorder	Model 5 Proportion of DAMA among SUD-involved hospitalizations with drug use disorder	Model 6 Proportion of DAMA among SUD-involved hospitalizations with opioid use disorder
Time (months)	Coef. (95% CI)	Coef. (95% CI)	Coef. (95% CI)	Coef. (95% CI)	Coef. (95% CI)	Coef. (95% CI)
Post	−0.01 (−0.03, 0.01)	−0.03 (−0.08, 0.01)	0.03 (−0.01, 0.06)	−0.02 (−0.04, 0.01)	0.001 (−0.03, 0.03)	−0.07 (−0.13, 0.00)
(pre-ACA = 0; post-ACA = 1)	0.06 (−0.39, 0.51)	−0.36 (−1.25, 0.53)	−0.47 (−1.24, 0.29)	0.30 (−0.26, 0.85)	−0.20 (−0.82, 0.43)	1.46 (0.13, 2.80)
Time*post	0.03 (−0.001, 0.06)	0.04 (−0.02, 0.11)	0.01 (−0.05, 0.07)	0.03 (−0.01, 0.07)	0.03 (−0.02, 0.07)	0.07 (−0.02, 0.17)
Quarter (vs. Quarter 1)						
Quarter 2	0.64 (0.34, 0.94)	0.68 (0.10, 1.27)	1.01 (0.51, 1.52)	0.58 (0.20, 0.96)	0.80 (0.38, 1.22)	1.40 (0.50, 2.30)
Quarter 3	0.68 (0.37, 0.99)	1.01 (0.41, 1.62)	0.67 (0.15, 1.19)	0.63 (0.24, 1.01)	0.85 (0.42, 1.28)	1.34 (0.42, 2.26)
Quarter 4	0.40 (0.06, 0.75)	0.78 (0.11, 1.45)	0.23 (−0.36, 0.81)	0.36 (−0.07, 0.79)	0.61 (0.13, 1.10)	0.30 (−0.73, 1.33)
Constant	10.44 (10.14, 10.75)	13.18 (12.58, 13.78)	7.56 (7.05, 8.08)	9.91 (9.53, 10.28)	11.24 (10.81, 11.66)	16.38 (15.47, 17.28)

Notes. Interrupted time series models were adjusted for autocorrelation by using Prais-Winsten method and for seasonality by adding quarterly indicators. Boldface: $p < 0.05$. CI: confidence interval; DAMA: discharge against medical advice; SUD: substance use disorder.

in order to reduce DAMA and associated poorer outcomes.

4.1. Key findings

Our major finding concerns that the increase in Medicaid coverage after ACA was not linked to the reduction of DAMA among hospitalizations due to SUD diagnoses. In line with previous study showing Medicaid coverage as one of the strongest predictors of DAMA in short-stay care hospitals (Tawk et al., 2013), our results show that DAMA was consistently more prevalent among SUD-hospitalizations with Medicaid than those with other insurance types (e.g., private, Medicare) before and after ACA periods. The ACA enactment expands insurance coverage and benefits of SUD treatment to more individuals with SUDs through Medicaid expansion and health exchanges, which also provides the opportunities to reduce DAMA. It was estimated that 14.6% of potentially new Medicaid expansion enrollees have an SUD compared to 11.5% of traditional Medicaid enrollees (Busch et al., 2013). However, the potential constraints of Medicaid coverage for SUD treatment benefits, patient's lack of adequate knowledge toward SUD treatment benefits, or patient's financial barriers may contribute to limited utilization of SUD treatments and DAMA (Ali et al., 2017; Cummings et al., 2014; Grogan et al., 2016). For example, the ACA requires that Medicaid expansion must include SUD benefits in the Essential Health Benefits but there is no such mandate requirement for the traditional Medicaid, and Medicaid in the majority of states does not cover comprehensive treatments for SUDs (Grogan et al., 2016). Further, an estimate of less than 50% of addiction treatment programs that accepted Medicaid for SUD treatment coverage were in the states with fewer or limited Medicaid benefits (Andrews et al., 2018). Provisions of financial incentive to states in order to expand Medicaid's SUD services and developments of more publicly-owned SUD treatment programs are needed to improve SUD treatment and its capabilities (Andrews et al., 2018; Grogan et al., 2016). In addition, SUD patients who left hospital or other treatment facilities prematurely may be related to other individual-level factors. For instance, financial difficulties were common among SUD patients with DAMA or with Medicaid but not seeking SUD treatment (Ali et al., 2017; Brorson et al., 2013). Thus, more efforts aimed at enhancing SUD treatment benefits in the traditional Medicaid and Medicaid expansion and public SUD treatment systems are needed to reduce DAMA and improve SUD treatment outcomes. Given the opioid crisis, our finding of the high proportion of DAMA among patients with OUD highlights the importance of implementing clinical services (e.g., addiction consultation, treatment linkage services) to improve access to medication-assisted treatment for OUD, treatment retention, or follow-up care (Connery, 2015; Shanahan et al., 2010; Trowbridge et al., 2017).

4.2. Limitations

This study has limitations. The analysis was based on inpatient encounter-level data rather than patient-level data, and patients with repeated treatment admissions could not be identified (HCUP, 2017). The NIS data do not allow the analysis of reasons for DAMA directly as well as provider and system-level factors. In addition, we used 2014 national ACA implementation as a cut-point for DAMA comparison, and we were unable to isolate the Medicaid expansion states before 2014 and control for variations in Medicaid benefits for SUD treatment because NIS cannot be used to support the state-level analysis. In our analysis, we have included variables of the hospital's region and an indicator of household income quartile to mitigate the potential bias.

5. Conclusions

This study is among the first to examine the potential impact of the ACA on DAMA among hospitalizations for SUDs. The overall findings indicate that despite an increase in the proportion of patients with

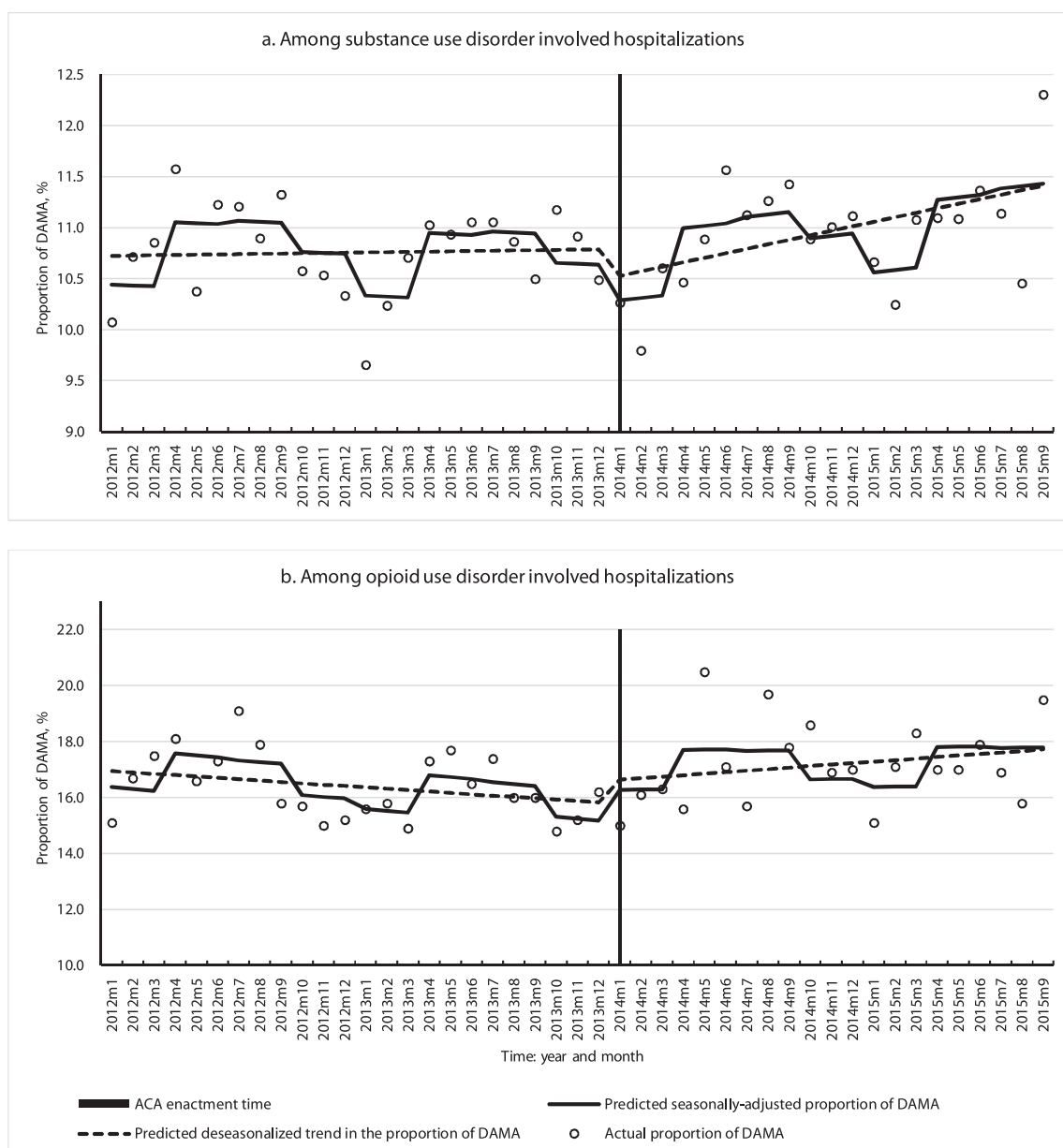


Fig. 1. Interrupted time series analysis of monthly proportions of discharge against medical advice (DAMA) among substance and opioid use disorder involved hospitalizations: National Inpatient Samples, 2012–2015Q3.

Medicaid among SUD-involved hospitalizations, no significant change in the proportion of DAMA following the ACA was observed during the study period. Continuous research, training, and outreach efforts are needed to mitigate individual, financial, and structural barriers to admitting SUD treatment and retaining in the treatment, especially among patients on Medicaid or with OUD.

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Contributors

H Zhu contributed to study designs, conducted literature searches and data analyses, and drafted the manuscripts. LT Wu contributed to study designs and analyses, drafted the manuscripts, and supervised the work. All authors approved the final draft of the manuscript.

Conflict of interest

LT Wu has received research funding from Patient-Centered Outcomes Research Institute, Centers for Disease Control and Prevention, Duke Endowment, and Alkermes Inc. H Zhu has no conflict of interest to disclose.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.drugalcdep.2018.12>.

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