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EMPIRICAL REPORT

Racial and Ethnic Differences in Psychiatry Resident Prescribing: a Quality Improvement Education Intervention to Address Health Equity

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Abstract

Objective Quality improvement (QI) tools can identify and address health disparities. This paper describes the use of resident prescriber profiles in a novel QI curriculum to identify racial and ethnic differences in antidepressant and antipsychotic prescribing.

Methods The authors extracted medication orders written by 111 psychiatry residents over an 18-month period from an electronic medical record and reformatted these into 6133 unique patient encounters. Binomial logistic models adjusted for covariates assessed racial and ethnic differences in antipsychotic or antidepressant prescribing in both emergency and inpatient psychiatric encounters. A multinomial model adjusted for covariates then assessed racial and ethnic differences in primary diagnosis. Models also examined interactions between gender and race/ethnicity.

Results Black (adjusted OR 0.66; 95% CI, 0.50–0.87; $p < 0.01$) and Latinx (adjusted OR, 0.65; 95% CI, 0.49–0.86; $p < 0.01$) patients had lower odds of receiving antidepressants relative to White patients despite diagnosis. Black and Latinx patients were no more likely to receive antipsychotics than White patients when adjusted for diagnosis. Black (adjusted OR 3.85; 95% CI, 2.9–5.2) and Latinx (adjusted OR 1.60; 95% CI, 1.1–2.3) patients were more likely to receive a psychosis than a depression diagnosis when compared to White patients. Gender interactions with race/ethnicity did not significantly change results.

Conclusions Our findings suggest that racial/ethnic differences in antidepressant prescription likely result from alternatively higher diagnosis of psychotic disorders and prescription of antipsychotics in Black and Latinx patients. Prescriber profiles can serve as a powerful tool to promote resident QI learning around the effects of structural racism on clinical care.

Keywords Quality improvement · Resident education · Health equity · Racism · Health disparities · Prescribing patterns

Quality improvement (QI) consists of a systematic set of actions aiming to improve structural, process, and outcome metrics in clinical healthcare delivery [1]. Recognizing the importance of QI, the Accreditation Council for Graduate Medical Education (ACGME) added systems-based practice and practice-based learning and improvement (PBLI) as two of the six core competencies in psychiatry residency education.

In addition, the ACGME found "a substantive deficiency in preparing residents and fellows to both identify and address disparities in health care outcomes, as well as ways to minimize or eliminate them" [2]. With "equity" as one of its six primary aims, the use and application of QI in education may help address a current deficit in learning about health disparities in resident training [3]. Scholars have increasingly called for the advancement of quality and equity together through the application of QI interventions to reduce racial/ethnic health disparities [4]. Prior research has demonstrated the potential for QI to improve mental health equity [5]; however, we have yet to see this approach applied to psychiatric resident education. In this paper, we describe a novel use of QI in resident training that facilitates the identification of health inequities, and empowers residents' ability to envision ways to address them.

Our institution designed an innovative, longitudinal QI curriculum spanning all 4 years of residency with steadily increasing levels of conceptual complexity [6]. One key component of

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this curriculum involves the creation and implementation of resident prescriber profiles generated from the electronic medical record (EMR) at one of our primary clinical sites, in order to provide clinical data to residents as part of PBLI.

Prior scholarship describes the use of prescriber profiles [7]. We have adapted and applied the use of resident prescribing profiles to our training program as part of a QI educational intervention to provide PBLI to residents. Residents receive details about their own individual prescribing patterns alongside blinded resident peers' prescribing patterns. Instructors provide aggregated summary data about commonly prescribed medication classes as related to race/ethnicity, age, and diagnosis sub-categories.

After we applied racial/ethnic sub-categories to the prescribing profile QI educational intervention, residents in the QI curriculum observed visual differences among the aggregated cross-tabulation of medication classes by racial/ethnic groups. Specifically, residents noted that Black patients appeared to receive fewer antidepressants and more antipsychotics relative to their White counterparts. However, visual differences could not fully characterize quantitatively differences between the racial/ethnic groups, nor the role of diagnosis on prescribing patterns.

In this study, we report our QI investigation of these observed racial/ethnic differences in resident prescribing. Following resident-generated hypotheses, we predicted that prescribing patterns for residents in our program would mirror national and historical trends of racial/ethnic differences in psychiatric diagnoses and prescription of psychotropics [8–10]. We accordingly test the following three hypotheses: First, Black patients received fewer antidepressants relative to White patients. Second, Black patients received more antipsychotics relative to White patients. Third, Black patients were more likely to be diagnosed with psychotic disorders relative to White patients. Recognizing the intersectional nature of identity, we hypothesized that Black men in particular would receive fewer antidepressants and more antipsychotics, and be more likely to be diagnosed with psychotic disorders.

Although population-based studies have extensively tested these hypotheses, to our knowledge, this is the first study that assesses psychiatry resident prescribing differences by race/ethnicity. We further discuss opportunities for this QI intervention to promote learner insight into potential effects of racism in psychiatric practice.

Methods

Data Source

For an annual QI didactic, we created class-wide and individual prescriber profiles and provided them to all program residents. In collaboration with our clinical data analytics team, we obtained prescribing data on medication orders through our EMR [11]. Residents wrote a total of 38,769 unique medication orders between July 2018 and December 2019. These data included patient characteristics such as age, race, and diagnosis; medication name and scheduling; and practice location. Our team updated all extracted data from our EMR quarterly and displayed it using a data visualization tool [12]. Residents were de-identified and numbered on the visual dashboard. Corresponding individual reports were generated and provided to residents to demonstrate the number of prescriptions ordered by treatment category, which was further stratified based on patient diagnosis, race/ethnicity, and treatment location. In the QI didactic, our QI curriculum director and each individual resident class openly discussed findings, prompting insights into why certain medications were prescribed more than others. Our instructor asked open-ended questions about each drug class, eliciting resident identification of group prescribing trends: when residents identified a pattern, our instructor used a Socratic method to gain insight into these observations. Through this discussion, residents identified a visual finding suggesting a lower rate of antidepressant prescription to Black patients (see Fig. 1). Residents then formulated a hypothesis and collaborated with faculty to design this study, limiting the analysis to antidepressants, antipsychotics, and mood stabilizers only. Analyses of other drug classes were not completed.

Study Sample

In our data analysis, we reformatted individual resident prescriptions into 9779 individual patient encounters. From this initial sample, we completed a selection process to optimize data quality as shown in Fig. 2. We chose patient encounters as our sample unit instead of individual patients since encounters represented a patient-resident relationship and a single patient could receive different diagnoses depending on the setting or provider. We linked each encounter with patient demographics (age, sex, race, ethnicity), treatment location, primary diagnosis, and binary variables (yes = 1, no = 0) for whether particular pharmacotherapy classes were prescribed by a resident. We limited our analysis to antidepressant, antipsychotic, and mood stabilizers given our resident-generated hypothesis. We categorized primary diagnoses to differentiate treatment algorithms that would be more or less likely to include antipsychotics. We classified major depressive disorder without psychosis and unspecified mood disorders as "Depression." We classified any primary psychotic illness or mood disorder with psychosis was as "Psychosis." We further differentiated bipolar disorder, whether in a manic or depressive phase, given the likelihood of antipsychotic use for mood stabilization. We categorized race/ethnicity into Black, White, Latinx, and Asian groups. All individuals who self-identified as "Hispanic" were considered "Latinx" in our analyses,

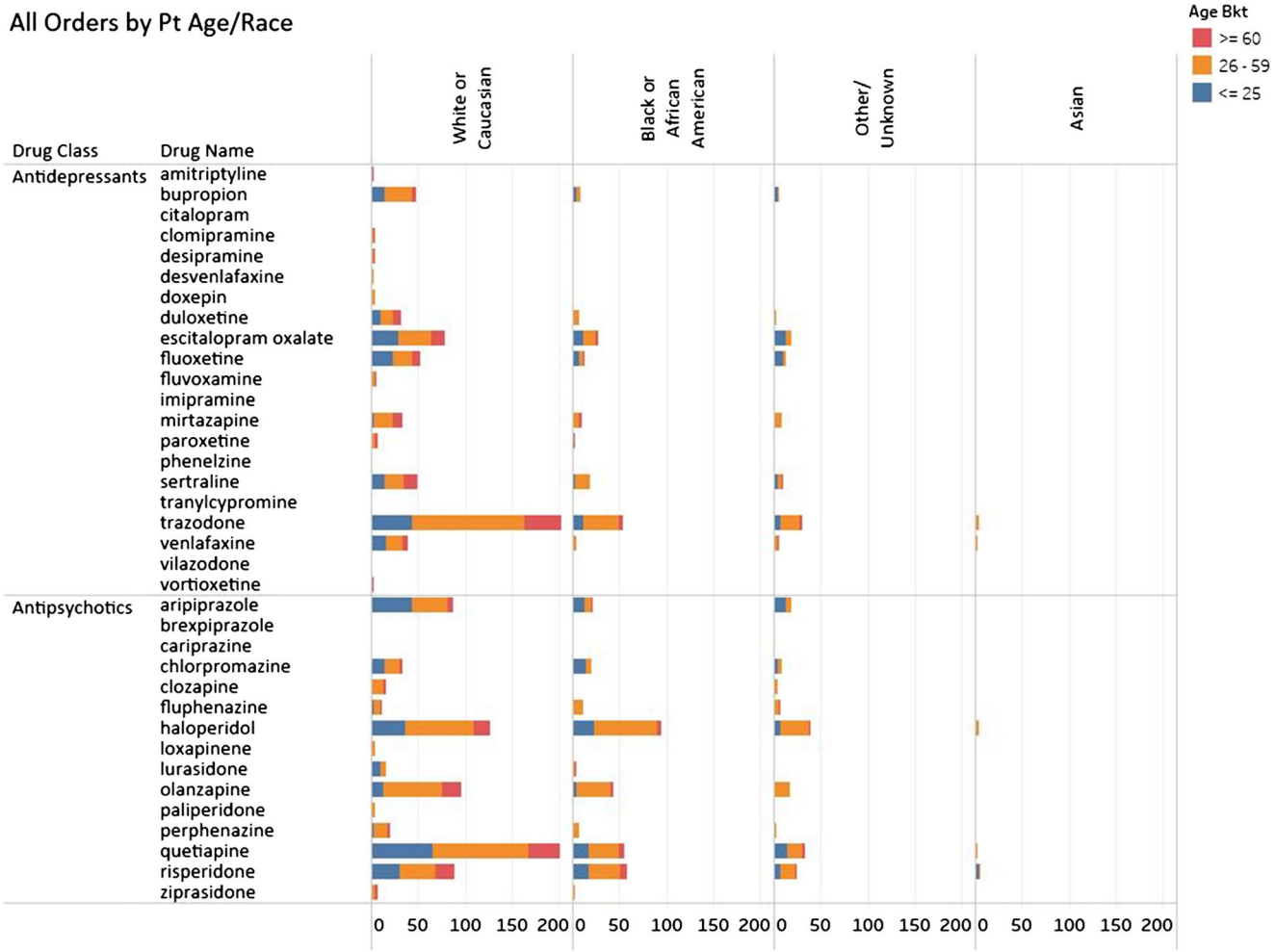

Fig. 1 Quality improvement didactic visual that identified a possible difference in prescribing by race, and generated our study hypothesis

regardless of racial self-identification. We excluded members of other racial groups, including American Indian or Alaska Native ($n = 24$) and Native Hawaiian or Other Pacific Islander ($n = 4$) due to small sample sizes. To preserve data integrity, we excluded encounters for which race was identified as Other/Unknown ($n = 99$) and Patient Refused ($n = 86$), and when encounters took place at outpatient sites, inpatient medical units, and unidentified locations due to a high frequency of missing data at these locations ($n = 3938$). The resulting data comprised Analytic Sample 1, or patient encounters that took place in the psychiatric emergency department and led to either discharge or admission to inpatient psychiatry.

To characterize our study sample, we performed omnibus testing for demographic, number of encounters per patient, and outcome variables—including pharmacotherapy and diagnosis—by racial and ethnic groups. We performed chi-squared analyses for categorical variables, including gender, treatment location, pharmacotherapy, and diagnosis. We performed a Kruskal-Wallis testing for age and number of encounters due to non-parametric distribution. Age exhibited a positive skew likely due to the inclusion of patients treated in the inpatient child and adolescent psychiatry units and number of encounters likewise exhibited a positive skew as more patients had fewer encounters. Pairwise comparisons for significant omnibus findings were performed using chi-squared and Mann-Whitney U testing for categorical and numerical variables, respectively. We employed Bonferroni corrections for multiple testing.

Analysis

Antidepressant Prescription

To test our study hypothesis, we first used binomial logistic regression with antidepressant prescription as our outcome variable and race/ethnicity as our primary predictor variable. We adjusted for gender, age, practice setting, number of encounters, and whether the patient received a mood stabilizer prescription, a proxy for bipolar disorder. We also tested for interactions between race/ethnicity and gender. We then performed a second logistic regression adjusting for diagnosis on a subset of the data limited to encounters that resulted in inpatient psychiatric admission (see "ED to IP Psych" in

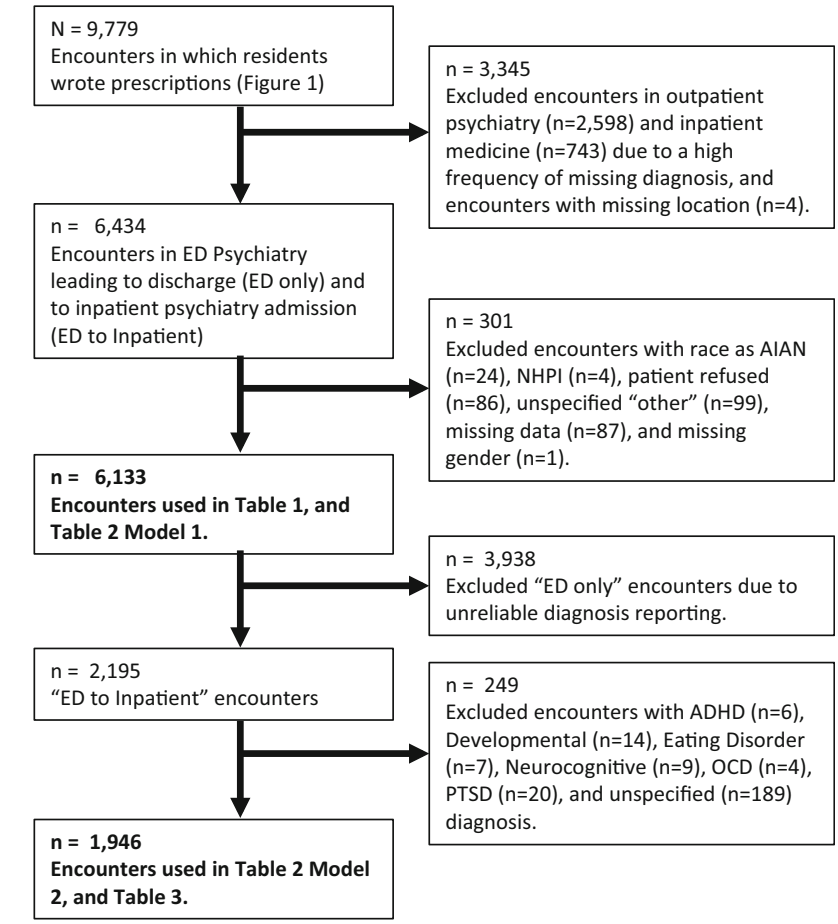

Fig. 2 Development of final analytical samples. Data: Electronic health record encounters between July 1, 2018, and December 31, 2019, where psychiatry residents wrote medication prescriptions

Tables 1 and 2); primary diagnosis was more consistently reported in these encounters and new medication trials were expected to occur here. In encounters limited to the emergency department (see "ED only" in Tables 1 and 2), we expected trainees to primarily continue outpatient antidepressant prescriptions, instead of initiating new ones. These encounters comprised Analytic Sample 2.

Antipsychotic Prescription

We repeated these tworeports results of further analyses of the relationship between diagnosis and race/otic prescription as the outcome variable. We then further analyzed the relationship between scheduled and as-needed antipsychotic prescription and race/ethnicity. To assess for racial/ethnic disparities in antipsychotic prescription, we performed additional logistic regressions on a subset of the data for patients with non-psychotic diagnoses. We omitted the adjustment for mood stabilizer prescription in antipsychotic models.

Diagnosis

Using encounters from Analytic Sample 2, we used multinomial logistic regression with primary diagnosis as our outcome variable and race/ethnicity as our primary predictor variable. We adjusted for gender and age, and tested for interactions between race/ethnicity and gender. We omitted encounters with Asian race from this final analysis due to small sample size ($n = 57$). With depression set as the reference diagnosis, we calculated odds ratios (OR) and 95% confidence intervals (CI) for each variable across diagnostic categories (Table 2). We performed all analyses in R (version 4.0.1) [13].

Table 1 Characteristics of encounter samples (*n* (%))

	Total *n*=6133	Racial/ethnic group				*p* value
		White *n*=3536 (57.7%)	Black *n*=1387 (22.6%)	Latinx *n*=1096 (17.9%)	Asian *n*=114 (1.9%)	
All encounters						
Gender						0.23
Female	2775 (45.3%)	1631 (46.1%)	616 (44.4%)	472 (43.1%)	56 (49.1%)	
Male	3358 (54.7%)	1905 (53.9%)	771 (55.6%)	624 (56.9%)	58 (50.9%)	
Age[†]	36.2 (17.1)	38.7 (18.2)	33.9 (15.0)	32.2 (14.5)	26.7 (12.1)	***
Location						***
ED only	3938 (64.2%)	2236 (63.2%)	945 (68.1%)	706 (64.4%)	51 (44.7%)	
ED to IP Psych	2195 (35.8%)	1300 (36.8%)	442 (31.9%)	390 (35.6%)	63 (55.3%)	
Pharmacotherapy						
Antidepressant[‡]	1707 (27.8%)	1130 (31.9%)	272 (19.6%)	269 (24.5%)	36 (31.6%)	***
Antipsychotic[§]	3408 (55.6%)	1801 (50.9%)	911 (65.7%)	644 (58.8%)	52 (45.6%)	***
Mood stabilizer [‖]	660 (10.8%)	463 (13.1%)	99 (7.1%)	86 (7.8%)	12 (10.5%)	***
No. of encounters[†]	1.45 (1.09)	1.43 (1.04)	1.51 (1.17)	1.47 (1.29)	1.16 (0.55)	**
Inpatient encounters						
Diagnosis						***
Depression	1127 (57.9%)	710 (60.8%)	180 (46.2%)	202 (60.8%)	35 (61.4%)	***
Psychosis	386 (19.8%)	179 (15.3%)	132 (33.8%)	63 (19.0%)	12 (21.1%)	***
Bipolar disorder	134 (6.9%)	93 (8.0%)	19 (4.9%)	19 (5.7%)	3 (5.3%)	0.14
Anxiety	87 (4.5%)	60 (5.1%)	13 (3.3%)	13 (3.9%)	1 (1.8%)	0.30
Other[#]	212 (8.9%)	125 (10.7%)	46 (11.8%)	35 (10.5%)	6 (10.5%)	0.94

SD standard deviation, *ED* emergency department, *IP Psych* inpatient psychiatry

[†] Reporting mean and standard deviation for continuous variables. Kruskal-Wallis test used due to non-parametric distribution (positive skew due to inclusion of Child and Adolescent Inpatient Psychiatry Units). All other analyses were performed using chi-squared tests

[‡] Antidepressant = selective serotonin reuptake inhibitors, serotonin–norepinephrine reuptake inhibitors, tricyclic antidepressants, monoamine oxidase inhibitors, and ketamine

[§] Antipsychotics = typical and atypical

[‖] Mood stabilizers = lithium, valproic acid, carbamazepine, oxcarbazepine, and lamotrigine

[#] Condensed personality disorders ($n = 48$), disruptive disorders ($n = 75$), and substance dependence disorders ($n = 89$) into "Other" due to small sample sizes

$^{**}p < 0.01$, $^{***}p < 0.0001$

Results

One hundred eleven residents provided care to 4253 patients during a total of 6133 encounters; the number of encounters per patient ranged from 1 to 13 with a median of 1. Table 1 reports characteristics of these encounters. Chi-squared analyses revealed significant differences by race/ethnicity across dimensions of age, treatment location, number of encounters, antidepressant and antipsychotic receipt, and diagnosis. In our post hoc pairwise tests, Black, Latinx, and Asian patients were significantly younger than White patients. Asian patients were significantly less likely to have multiple encounters relative to all other patients and were more likely to be admitted to inpatient psychiatry relative to Black patients. Black patients were significantly less likely to receive an antidepressant relative to White patients; by contrast, Black patients were significantly more likely to receive an antipsychotic relative to White patients. Black patients were less likely to be diagnosed with depression and more likely to be diagnosed with psychosis relative to White patients.

Antidepressant and Antipsychotic Prescription

Table 2 reports findings of models testing the likelihood of receiving an antidepressant or antipsychotic prescription by race/ethnicity. Adjusting for age, gender, practice setting, number of encounters, and whether the patient received a mood stabilizer prescription, the odds of receiving an

Table 2 Logistic regressions: Factors predicting pharmacotherapy, adjusted odds ratio (95% confidence interval)

	Antidepressants				Antipsychotics			
	Model 1		Model 2		Model 1		Model 2	
	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value
Age	0.96 (0.91–1.02)	0.225	1.02 (0.92–1.12)	0.694	1.01 (0.95–1.06)	0.899	1.02 (0.933–1.13)	0.602
Sex								
Male	1.00		1.00		1.00		1.00	
Female	1.62 (1.44–1.82)	***	1.56 (1.28–1.91)	***	0.95 (0.86–1.05)	0.332	1.01 (0.84–1.22)	0.926
Race/ethnicity								
White	1.00		1.00		1.00		1.00	
Black	0.52 (0.45–0.61)	***	0.66 (0.50–0.87)	**	1.84 (1.61–2.10)	***	0.96 (0.75–1.23)	0.742
Latinx	0.69 (0.59–0.81)	***	0.65 (0.49–0.86)	**	1.36 (1.18–1.57)	***	0.92 (0.71–1.19)	0.511
Asian	0.90 (0.59–1.35)	0.628	0.73 (0.40–1.32)	0.308	0.84 (0.57–1.22)	0.363	0.60 (0.35–1.04)	0.071
Sex-race interaction								
Male-White	1.00		1.00			1.00	1.00	
Male-Black	0.46 (0.37–0.58)	***	0.52 (0.34–0.80)	**	2.23 (1.87–2.70)	***	0.95 (0.66–1.36)	0.772
Male-Latinx	0.58 (0.46–0.73)	***	0.44 (0.28–0.68)	**	1.55 (1.29–1.87)	***	1.12 (0.77–1.63)	0.554
Male-Asian	0.91 (0.49–1.61)	0.756	0.51 (0.18–1.26)	0.184	0.96 (0.56–1.63)	0.636	0.49 (0.22–1.07)	0.077
Location								
ED only	1.00				1.00			
ED to IP Psych	1.53 (1.36–1.73)	***			1.39 (1.24–1.55)	***		
Mood stabilizer	1.18 (0.98–1.40)	0.072	1.30 (0.97—1.73)	0.080				
No. of encounters	1.04 (1.01–1.07)	**	0.96 (0.90–1.02)	0.158	1.13 (1.10–1.17)	***	1.12 (1.06–1.19)	**
Diagnosis								
Anxiety			8.70 (5.13–15.0)	***			1.00	
Psychosis			1.00				3.45 (2.12–5.65)	***
Depression			5.46 (3.94–7.71)	***			1.48 (0.95–2.32)	0.081
Bipolar			1.52 (0.89–2.57)	0.118			3.06 (1.74–5.45)	**
Disruptive			1.53 (0.75–2.96)	0.225			5.14 (2.59–10.62)	***
Personality			2.71 (1.33–5.38)	**			1.74 (0.85–3.64)	0.134
Substance			2.36 (1.32–4.14)	**			1.79 (0.98–3.30)	0.057

Model 1 uses 6133 patient encounters in both emergency and inpatient psychiatry units. Model 2 uses a subset of 1946 encounters in inpatient psychiatry units for which diagnosis is reliably reported. *OR* adjusted odds ratio, *CI* confidence intervals, *ED* emergency department, *IP Psych* inpatient psychiatry, *Disruptive* disruptive, impulse-control, and conduct disorders, *Personality* personality disorders, *Substance* substance dependence disorders. *$p < 0.05$, **$p = 0.01$, ***$p < 0.0001$

antidepressant were lower for Black (adjusted OR, 0.52; CI, 0.45–0.61; $p < 0.0001$) and Latinx (adjusted OR, 0.69; CI, 0.59–0.81; $p < 0.0001$) patients, relative to White patients. These findings held true after further adjustment for inpatient diagnosis. Race by gender interactions revealed lower odds of receiving antidepressants for Black and Latino men.

By contrast, the odds of receiving any antipsychotic were higher for Black (adjusted OR, 1.84; CI, 1.61–2.10; $p < 0.0001$) and Latinx (adjusted OR, 1.36; CI, 1.18–1.57; $p < 0.0001$) patients relative to White patients; however, this effect was no longer seen after adjusting for inpatient diagnosis. Furthermore, Black patients were more likely to receive both scheduled (adjusted OR, 1.58; CI, 1.39–1.79; $p < 0.0001$) and as-needed (adjusted OR, 1.41; CI, 1.18–1.66; $p < 0.0001$) antipsychotics while Latinx patients were only more likely to receive scheduled (adjusted OR, 1.36; CI, 1.19–1.57; $p < 0.0001$) antipsychotics but not as-needed antipsychotics. These effects were no longer evident after adjustment for inpatient diagnosis.

Diagnosis

Table 3 reports results of further analyses of the relationship between diagnosis and race/ethnicity. Black patients had much higher odds of being diagnosed with psychosis

Table 3 Multinomial logistic regression: Factors predicting diagnosis, adjusted odd ratio (95% confidence interval)

	Anxiety		Psychosis		Bipolar		Disruptive		Personality		Substance	
	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value	OR (95% CI)	*p* value
Age	0.93 (0.75–1.2)	0.57	1.48 (1.3–1.7)	***	1.23 (1.0–1.5)	*	0.19 (0.10–0.35)	***	0.90 (0.65–1.2)	0.53	1.39 (1.1–1.7)	*
Sex												
Male	1.00	ref	1.00	ref	1.00	ref	1.00	ref	1.00	ref	1.00	ref
Female	0.84 (0.54–0.71)	0.44	0.55 (0.43–0.71)	***	1.12 (0.81–1.7)	0.40	0.36 (0.22–0.60)	***	2.70 (1.3–5.5)	*	0.41 (0.26–0.65)	*
Race												
White	1.00	ref	1.00	ref	1.00	ref	1.00	ref	1.00	ref	1.00	ref
Black	0.84 (0.45–1.6)	0.59	3.85 (2.9–5.2)	***	0.90 0.53–1.5)	0.69	2.13 (1.2–3.7)	*	1.01 (0.45–2.3)	0.98	1.18 (0.63–2.2)	0.60
Latinx	0.74 (0.39–1.4)	0.35	1.60 (1.1–2.3)	*	0.81 (0.48–1.4)	0.43	0.96 (0.50–1.8)	0.91	0.94 (0.41–2.1)	0.88	0.94 (0.50–1.8)	0.86
Gender:race												
Male:White	1.00	ref	1.00	ref	1.00	ref	1.00	ref	1.00	ref	1.00	ref
Male:Black	1.42 (0.64–3.1)	0.39	3.24 (2.2–4.9)	***	0.80 (0.32–2.0)	0.64	1.90 (0.95–3.8)	0.07	3.48 (0.91–13)	0.07	1.14 (0.51–2.6)	0.75
Male:Latinx	0.66 (0.24–1.8)	0.92	1.62 (1.04–2.5)	*	1.14 (0.54–2.4)	0.73	0.68 (0.28–1.6)	0.39	0.72 (0.08–6.3)	0.77	1.48 (0.73–3.0)	0.28

Encounters with Asian patients were excluded from this model due to small sampling for individual diagnoses. *OR* adjusted odds ratio, *CI* confidence intervals, *Bipolar* bipolar disorder, *Disruptive* disruptive, impulse-control, and conduct disorders, *Personality* personality disorders, *Substance* substance dependence disorders. Depression is the reference diagnosis for all odds ratios. *$p < 0.05$, **$p < 0.001$, ***$p < 0.0001$

(adjusted OR, 3.85; CI, 2.86–5.18; $p < 0.0001$) and disruptive disorders (adjusted OR, 2.13; CI, 1.23–3.71; $p < 0.05$; see Table 3), relative to White patients. Latinx patients were also more likely to receive a psychosis diagnosis (adjusted OR, 1.60; CI, 1.14–2.26; $p < 0.05$). No other relationships among diagnoses and racial/ethnic groups were found to be significant. Race/ethnicity by gender interaction analyses demonstrated significantly greater odds of psychosis diagnosis for Black men (adjusted OR, 3.24; CI, 2.16–4.93; $p < 0.0001$) and Latino men (adjusted OR, 1.64; CI, 1.05–2.59; $p < 0.05$) relative to White men.

Discussion

This observational study identifies multiple key findings that add insight and nuance to resident observations of racial/ethnic differences in resident prescribing profiles during a QI education intervention. First, Black and Latinx patients were less likely to receive antidepressant prescriptions even after adjustment for diagnosis. Second, no racial differences in antipsychotic prescription were found after adjustment for diagnosis. Third, Black and Latinx patients were significantly more likely to be diagnosed with psychosis, relative to White patients. Together, these findings suggest that racial/ethnic differences in antidepressant prescription that residents originally observed during our QI didactic likely result from alternatively higher diagnosis of psychotic disorder and prescription of antipsychotics in Black and Latinx patients. Although these findings are limited in their generalizability, they exemplify how QI can enrich understanding among psychiatry residents about the effects of individual and structural racism on patient care. Here, we discuss our three key findings and review educational topics addressed during presentation of these findings in resident didactics and in a department-wide venue.

We found a significant difference in antidepressant prescription for Black and Latinx patients relative to White patients that persisted after adjusting for diagnosis. This finding parallels prior research demonstrating that Black and Latinx patients are less likely to receive antidepressants relative to White populations [14]. Black and Latinx patients were more likely to receive antipsychotics relative to White patients; however, this effect was no longer significant after adjustment for diagnosis. Yet, Black and Latinx patients were more likely to be diagnosed with psychotic disorders relative to White patients. These results suggest that racial/ethnic differences in antipsychotic prescription are not due to their use as adjuvant treatment or inappropriate prescription, but rather that Black and Latinx patients are disproportionately diagnosed with psychosis or disruptive disorders within our institution's inpatient settings. This finding corroborates prior research

demonstrating that Black Americans are more likely to be diagnosed with schizophrenia as opposed to mood disorders compared to other racial groups, even when presenting with similar symptoms [15]. By contrast, other studies have found that Latinx patients are less likely to receive a psychosis diagnosis and more likely to receive a depression diagnosis despite endorsing psychosis symptoms at higher rates [16]. Given the heterogeneity of Latinx-identified patients in the USA, it is possible that findings for Latinx patients between studies may differ based on the particular sample's breakdown of racial identity, national origin, and immigration status.

These findings lend themselves to multiple educational points. First, analyses of prescriber data should account for patient preference. Although provider bias may influence antidepressant prescription, other factors including cultural attitudes, mental health stigma, and experiences of discrimination may contribute to refusal of antidepressants [17–20]. Second, diagnostic disclosure and consent to treatment deserve careful consideration for fostering patient trust [21], particularly among patient populations that have experienced exclusion and oppression within the institutions of medicine. Third, racial/ethnic differences in prescribing highlight the importance of the cultural formulation [22]. Eliciting individual contextual factors including narratives of distress and resilience and community support when formulating diagnoses and treatment plans can help avoid the harms of racial and ethnic stereotyping [23]. In particular, assessment of structural vulnerability—or the position within social hierarchies (e.g., socioeconomic, racial, cultural) [24]—of minoritized patients can inform understandings of susceptibility to psychotic disorders within a stress reactivity model. In some contexts, psychosis may be understood as a coded, embodied form of resistance to social oppression and racism [25]. Fourth, lessons from history can evince present trends and guide interventions. For instance, in discussion of our findings, residents—particularly residents of color—observed how Black male patients may be viewed as "paranoid" or "aggressive" and treated with sedating medications for behaviors residents characterized as socially normative. This observation parallels historical trends: In the 1960s and 1970s, shifting criteria that linked schizophrenia with hostility or aggression, characteristics that overlap with stereotypes of Black people—particularly Black men—as inherently violent, contributed to racial differences in diagnosis [26]. Finally, understanding the effects of structural racism—or the totality of ways in which societies foster racial discrimination through mutually reinforcing systems [27]—can direct attention toward institutional policy reforms to enhance equity [28–30]. These include reforms of preventative services, involuntary treatment, and security presence in psychiatric units. This QI intervention, and others like it, will thus advance future developments in psychiatry resident education on interview conduct, patient-provider and institutional trust, cultural formulation, and structural competency [31].

Our study findings carry limitations. Our study did not assess clinical presentation as a predictor of racial/ethnic differences in diagnosis. We are also unable to account for patient preference, a key component of an operationalized definition of health disparity [32]. Furthermore, we were unable to account for whether a prescription was actually administered to and taken by the patient, or whether prescriptions were new or re-orders. In addition, our unit of measure is patient encounters instead of individual patients, which limits the generalizability of our findings. We were also unable to adjust for additional covariates commonly seen in health disparity research such as insurance status, and socioeconomic status due to lack of availability of these data. Similarly, we were unable to account for multiple diagnoses or outpatient psychotherapy, given lack of access to these data. We did not systematically include resident feedback in the prescriber profile QI intervention, limiting the inclusion of qualitative data into our analyses. Finally, we were unable to consider provider-patient racial concordance which has been shown to affect racial/ethnic health outcomes [33]. Nonetheless, these findings merit further study within our health system, and showcase a powerful tool for psychiatry resident education.

Future directions for this work include analysis at multiple levels—health system, units, supervisor-resident, provider-patient, and individual—to address unanswered questions, such as whether these prescribing differences exist for attending providers and mid-level providers and at our other training sites. Within our QI didactics, we plan to replicate the analyses of prescribing patterns for all subsequent resident classes, presenting them at our annual QI didactics, and allowing residents to request future analyses of the data. Possible points of future focus include quality of prescribing, the use of polypharmacy, interactions between patients and police and/or ambulance staff before arrival, encounters with providers during medical clearance, and interactions with hospital security staff. We aim to also explore whether racial or ethnic differences exist across other psychotropic drug classes. Further longitudinal analyses can examine the persistence of these differences by resident over the period of training. Qualitative studies with patients, resident physicians, and supervisors may provide insights to direct QI interventions, both in the clinical setting and in the residency curricula. We aim to continue active resident-faculty collaboration on these projects as this collaboration has the potential to bring new perspectives [34].

In conclusion, we posit that QI educational interventions such as prescriber profiles demonstrate a unique opportunity to utilize data so that clinical providers and residents can employ an equity lens to study and intervene on variations in care. In our study, we used resident prescriber profiles to test hypotheses related to race and ethnicity in prescribing and

diagnosis. While our findings are consistent with existing literature, developing and applying these individual resident prescribing profiles is a consciousness-raising activity that can lead to important reflection by the trainee on health equity in their own practice and in that of their own institution. Although more research is needed to identify how to best address these differences within healthcare systems and academic medical settings, QI educational interventions and related quantitative data analyses can impact trainee education on multiple fronts and have the potential to lead to individual trainee and institutional improvements to provide more equitable patient care.

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Compliance with Ethical Standards

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