ORIGINAL RESEARCH

Impact of Demographics and Insurance Coverage on Schizophrenia Treatment and Healthcare Resource Utilization Within an Integrated Healthcare System

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Purpose: Little is known about the impact of health disparities on antipsychotic treatment and healthcare resource utilization (HRU) among patients with schizophrenia. The objective of this analysis is to examine treatment patterns and HRU by age, race/ethnicity, and insurance coverage among patients with schizophrenia in an integrated delivery network (IDN).

Patients and Methods: This cross-sectional study used electronic health record data from MedStar Health, an IDN in the Baltimore-Washington, DC, area. Patients were aged ≥18 years and had ≥2 outpatient encounters or ≥1 hospitalization with a diagnosis of schizophrenia between January 1, 2017 and March 31, 2021. Outcomes assessed included oral antipsychotic prescriptions, long-acting injectable antipsychotic (LAI) utilization, hospitalizations, emergency department (ED) visits, and outpatient visits. Analyses compared subgroups based on age, race/ethnicity (non-Hispanic Black, non-Hispanic White, and other), and type of insurance coverage at index (Medicare, Medicaid, and other) during 12 months of follow-up.

Results: A total of 78.1% of patients had ≥1 prescription for an antipsychotic and 69.1% received ≥1 second-generation antipsychotic. Second-generation long-acting injectables (SGA LAI) were utilized by 9.0% of patients, with the elderly and Medicaid beneficiaries having the lowest SGA LAI utilization. Overall, 61.7% of patients had ≥1 hospitalization, 56.4% had ≥1 outpatient visit, and 50.5% had ≥1 ED visit. Hospitalizations and ED visits were most common in those 18 to 24 years of age and in Medicaid beneficiaries, whereas outpatient visits were more common for the elderly and Medicare beneficiaries.

Conclusion: At the population level, the results indicate widespread underprescription/underutilization of antipsychotics that have been shown to improve clinical and economic outcomes in patients with schizophrenia, particularly SGA LAI. Within specific subpopulations, disparities in treatment selection and HRU were observed, suggesting the need for increased attention to at-risk groups to ensure consistent quality of care regardless of age, race/ethnicity, or insurance coverage.

Keywords: health disparities, race/ethnicity, antipsychotic prescription, long-acting injectable antipsychotics, second-generation antipsychotic, clinical outcomes

Introduction

Schizophrenia is a complex psychiatric disorder that resulted in an estimated economic burden of $343.2 billion in 2019.[1] This disorder significantly raises the risk of mortality compared to the general population, resulting in approximately 28.5 years of life lost per patient.[2] Goals of therapy in patients with schizophrenia are individualized and may include avoiding relapses, improving social functioning, and maximizing quality of life. At a population level, medication adherence, avoidance of the use of acute care services such as hospitals and emergency departments (EDs), and appropriate follow-up of patients after acute events have been identified as key indicators of quality of care.[3–7]

Recommendations to achieve these measures include the use of long-acting injectable (LAI) antipsychotics and providing patient care in the least restrictive setting that will allow for safe and effective treatment.

Social determinants of health such as race, socioeconomic status, and geographic location are key contributors to the incidence and burden of schizophrenia.[8–11] The burden of disease in patients with schizophrenia is further complicated by frequent gaps in insurance coverage,[12] poor health literacy,[13] and substantial non-psychiatric and psychiatric comorbidities, including alcohol and substance misuse.[14,15] As such, the psychiatric community has advocated for serious mental illness to be designated as a health disparity in efforts to facilitate its prioritization as a public health effort.[16,17]

Differences in antipsychotic prescriptions and healthcare resource utilization (HRU) based on race and ethnicity have been previously identified from real-world studies; however, less is known about the influence of age and insurance coverage on antipsychotic treatment patterns and HRU.[18–24] In order to overcome disparities in care, it is important to understand the contributing or exacerbating factors. To that end, this study examined the impact of race and ethnicity, age, and insurance type on treatment patterns and HRU in a large and diverse population of patients with schizophrenia receiving care in an integrated delivery network (IDN).

Materials and Methods

Study Design

This cross-sectional study used MedStar's Cerner electronic health record (EHR) platform, containing deidentified data from patients served by MedStar Health, an IDN in the Washington, DC, metropolitan area that includes 10 hospitals and more than 300 care locations. The EHR platform included data on inpatient, ambulatory (outpatient), and emergency visits within MedStar Health; accompanying diagnosis codes; insurance billing details; medications prescribed; and self-reported patient demographics such as race/ethnicity, smoking status, and living situation.

The study timeframe was January 1, 2017 to March 31, 2022. The earliest occurrence of a patient's qualifying diagnosis of schizophrenia during this window was defined as the index date, and study outcomes were examined in the 12 months following the index date.

Participants

Study patients were adults (aged ≥18 years old at index date) who had ≥2 outpatient encounters or ≥1 inpatient encounter with a discharge diagnosis of schizophrenia (International Classification of Diseases, 10th revision, clinical modification [ICD-10-CM] diagnosis code F20.x or F25.x) between January 1, 2017 and March 31, 2021.

Study Measures

Patient baseline characteristics included age, sex, self-identified race/ethnicity, insurance type, marital status, geography (rural or urban), employment, and living status at index. Body mass index (BMI) was calculated from height and weight recorded in the medical record. Elixhauser Comorbidity Index was calculated using ICD-10-CM diagnosis codes.[25,26]

Study outcomes included oral antipsychotic prescription, LAI utilization, and HRU during the 12-month follow-up period. Antipsychotic prescription/utilization was grouped by route of administration (oral or LAI) and by generation (first-generation or second-generation). HRU was described as the occurrence of ED visits, outpatient visits, and inpatient admissions. Mental health-related visits were defined as those with an ICD-10-CM code of F01.x-F99.x.

Analyses

Patients were stratified by age (18–24, 25–34, 35–44, 45–54, 55–64, and ≥65 years), race/ethnicity (non-Hispanic Black, non-Hispanic White, and other), and primary insurance type (Medicare, Medicaid, and other) at the index encounter. "Other" race/ethnicity included a small number of participants who self-identified as either Hispanic, Asian-Pacific Islander, multiracial, multiethnic, or other/unknown race or ethnicity. "Other" insurance included insurance that was government issued, commercial or private, or not present (none/self-payment).

Unadjusted, univariate analyses were used to describe all study outcomes, both overall and across sociodemographic subgroups. In addition to frequency and proportion, measures to assess distribution/spread (minimum, maximum, range), central tendency (median, mean), and variability (standard deviation) were employed when appropriate. Unadjusted, bivariate analyses presented both cross-tabulations (Chi-squared) and differences in means (Student's t-tests of means/Mann–Whitney U-tests) to assess for associations within sociodemographic categories.

Simple logistic regression was conducted to investigate the impact of age group, sex, race/ethnicity, or the insurance type of patients with schizophrenia on the probability of antipsychotic medication prescription/utilization and HRU. Multivariate logistic regression was conducted to control for race/ethnicity, age, and insurance type. Unadjusted and adjusted odds ratios (OR and OR_a, respectively), 95% confidence intervals (CIs), and P-values were measures used to investigate and describe the associations.

All statistical analyses were conducted using SAS version 9.3 and R version 4.2.2, with tests conducted assuming a two-tailed test of significance and alpha level set a priori at 0.05.

Results

Participants

A total of 10,026 patients with schizophrenia were included in the study (Supplemental Figure 1). The mean (standard deviation) age of study participants was 46.0 (16.0) years and 43.7% of the population was female (Table 1). The study population was predominantly Non-Hispanic Black (65.1%), with 24.3% of patients identifying as Non-Hispanic White, and 10.7% fitting the other race/ethnicity category. Medicaid was the primary insurance type at index for nearly half of

Table 1 Baseline Characteristics

	All Patients N = 10,026
Male, n (%)	5643 (56.3%)
Age (years), mean (SD)	46.0 (16.0)
Age group (years), n (%)	
18–24	1000 (10.0%)
25–34	2021 (20.2%)
35–44	1634 (16.3%)
45–54	1863 (18.6%)
55–64	2216 (22.1%)
≥65	1292 (12.9%)
Race/ethnicity, n (%)	
Non-Hispanic White	2432 (24.3%)
Non-Hispanic Black	6523 (65.1%)
Other	1071 (10.7%)
Insurance type at index, n (%)	
Medicare	3935 (39.2%)
Medicaid	4833 (48.2%)
Other	1258 (12.5%)
Elixhauser Comorbidity Index, mean (SD)	3.99 (2.68)
Smoking status, n (%)	
Current smoker	3911 (39.0%)
Former smoker	935 (9.3%)
Non-smoker	4015 (40.0%)
Unknown	1165 (11.6%)

(*Continued*)

Table 1 (Continued).

	All Patients N = 10,026
Employment status, n (%)	
Disabled	2307 (23.0%)
Unemployed	1824 (18.2%)
Full-time employed	229 (2.3%)
Part-time employed	125 (1.2%)
Retired	168 (1.7%)
Student	149 (1.5%)
Part-time employed	125 (1.2%)
Other	77 (0.8%)
Unknown	5147 (51.3%)
Living situation, n (%)	
Housing with support	2407 (24.0%)
Housing without support	3448 (34.4%)
Mental health facility/hospital	31 (0.3%)
Unknown/missing	2975 (29.7%)
Unstable or temporary housing/homeless	1165 (11.6%)
Marital status, n (%)	
Single	8189 (81.7%)
Married	726 (7.2%)
Divorced	601 (6.0%)
Widowed	315 (3.1%)
Separated	162 (1.6%)
Unknown	33 (0.3%)

Abbreviation: SD, standard deviation.

patients (48.2%), with the remaining patients covered by Medicare (39.2%) and other or no insurance (12.5%). The majority of patients were single (81.7%), lived in urban areas (97.7%), and had a BMI ≥ 25 kg/m^2 (64.0%). Common psychiatric comorbid conditions included bipolar disorder (35.2%), anxiety (30.9%), and depression (26.9%).

Antipsychotic Prescription/Utilization

In the overall population, 78.1% of patients were prescribed at least one antipsychotic medication during the follow-up period, 47.9% received at least one first-generation antipsychotic (FGA), and 69.1% received at least one second-generation antipsychotic (SGA). SGA LAIs were prescribed to 9.0% of patients. Prescription/utilization of any antipsychotic, any FGA, an oral FGA, an oral SGA, or an SGA LAI decreased with age (Figure 1). Whereas FGA LAI use decreased with age among those aged 18 to 44 years, usage increased in patients aged 55 to 64 years and ≥ 65 years. Prescription/utilization of any antipsychotic medication was similar among non-Hispanic White and non-Hispanic Black patients, but FGA LAI use was higher among non-Hispanic Black patients (23.7%) compared to non-Hispanic White patients (17.7%; $P < 0.001$) (Figure 2). With the exception of SGA LAIs, Medicaid beneficiaries were more likely to receive the various types of antipsychotics compared to patients covered by Medicare or other insurance (Figure 3). Medicare beneficiaries had 20% lower odds of any SGA use compared to Medicaid beneficiaries (OR: 0.80 [95% CI: 0.73–0.88]; $P < 0.001$) (Supplemental Table 1). The same pattern was observed when age group or age group and race/ethnicity were held constant; patients with Medicare had 12% and 13% lower odds of any SGA use, respectively, compared to patients with Medicaid (OR$_a$: 0.88 [95% CI: 0.79–0.97]; $P = 0.012$; OR$_a$: 0.87 [95% CI: 0.79–0.96]; $P = 0.008$).
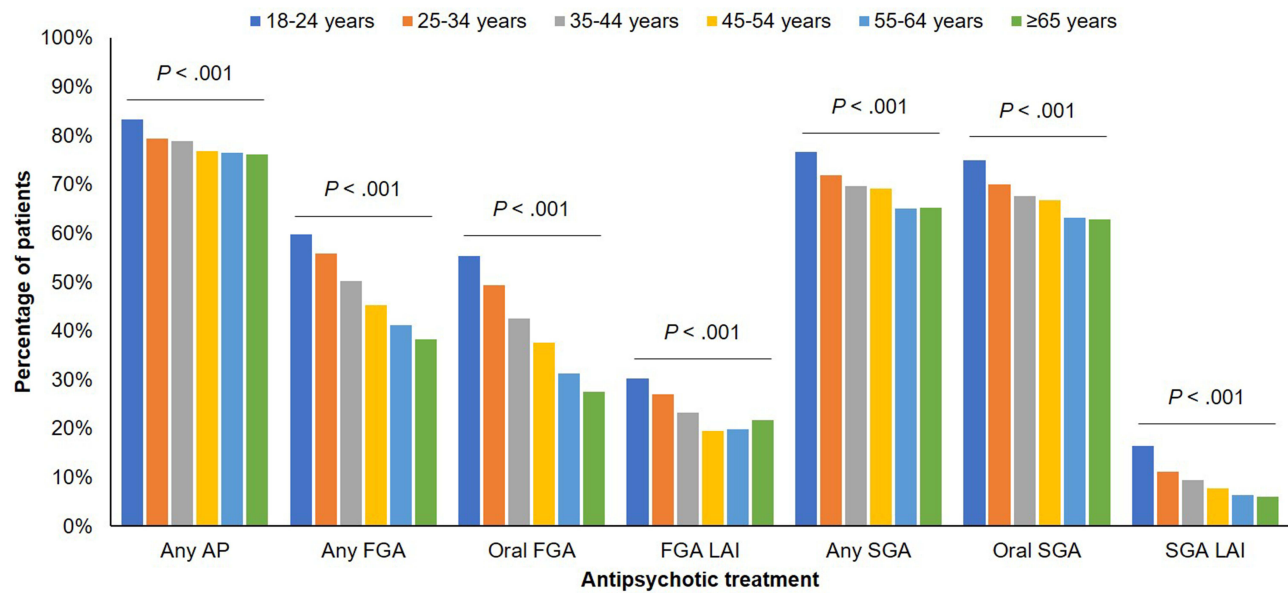
Figure 1 Antipsychotic prescription/utilization by age group.
Abbreviations: AP, antipsychotic; FGA, first-generation antipsychotic; FGA LAI, first-generation long-acting injectable; LAI, long-acting injectable; SGA, second-generation antipsychotic; SGA LAI, second-generation long-acting injectable.
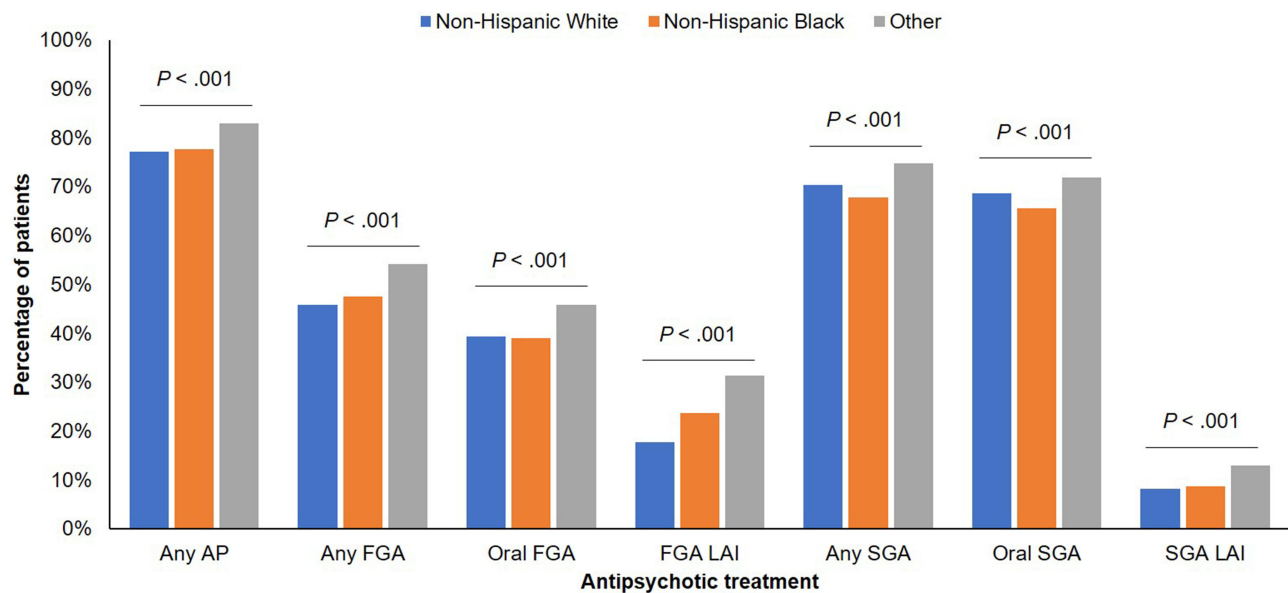

Figure 2 Antipsychotic prescription/utilization by race/ethnicity.
Abbreviations: AP, antipsychotic; FGA, first-generation antipsychotic; FGA LAI, first-generation long-acting injectable; LAI, long-acting injectable; SGA, second-generation antipsychotic; SGA LAI, second-generation long-acting injectable.

Healthcare Resource Utilization

Overall, 61.7% of patients had ≥1 all-cause hospitalization, 56.4% had ≥1 outpatient visit, and 50.5% had ≥1 ED visit during the 12 months following the first observed diagnosis of schizophrenia. Mental health-related hospitalizations, outpatient visits, and ED visits occurred in 61.4%, 43.8%, and 43.6% of patients, respectively.

Significant differences in HRU were observed across age, race/ethnicity, and insurance type subgroups. Patients aged 18 to 24 years were more likely to have ≥1 all-cause or mental health-related inpatient visit during the follow-up period than the other age groups, whereas patients aged ≥65 years were more likely to have ≥1 outpatient visit than the other age groups (Figure 4). Patients in the youngest and oldest age groups were less likely to have an ED visit compared to those aged 25 to 64 years.
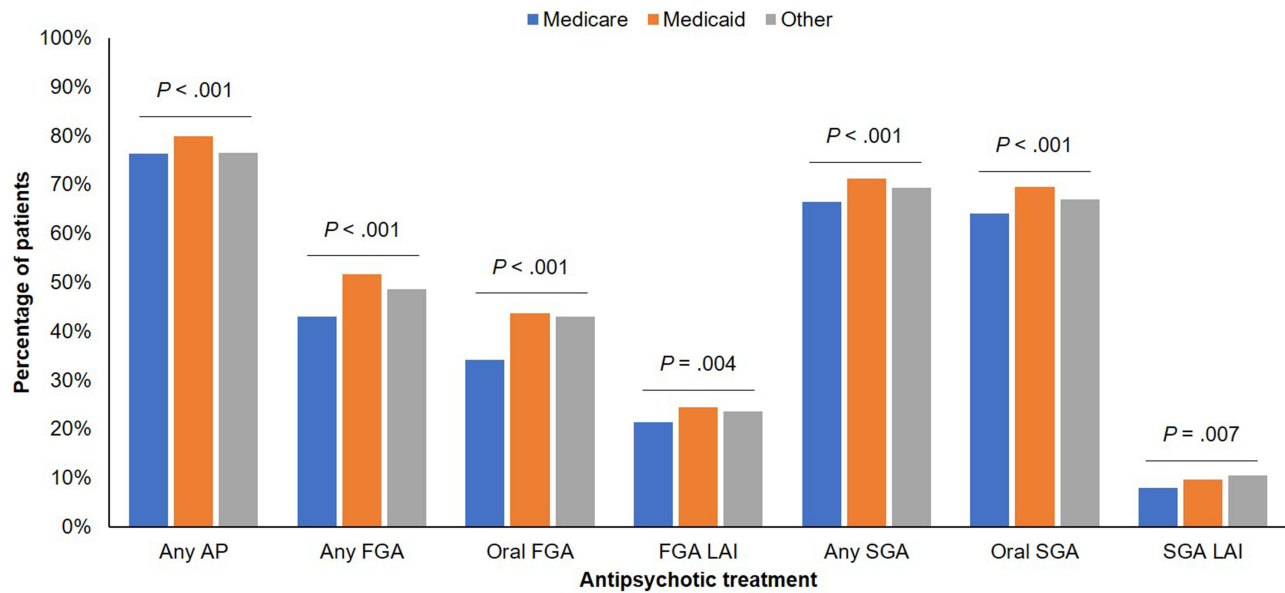
Figure 3 Antipsychotic prescription/utilization by type of insurance coverage.
Abbreviations: AP, antipsychotic; FGA, first-generation antipsychotic; FGA LAI, first-generation long-acting injectable; LAI, long-acting injectable; SGA, second-generation antipsychotic; SGA LAI, second-generation long-acting injectable.
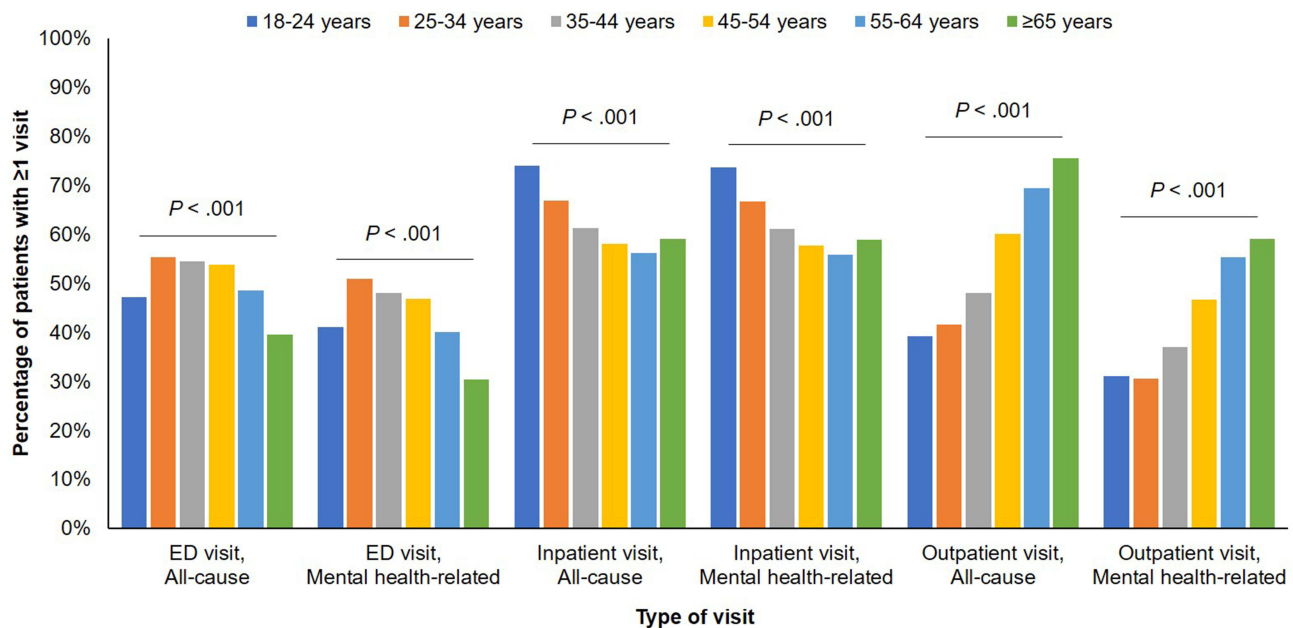

Figure 4 Healthcare resource utilization in the 12-month follow-up period by age group.
Abbreviations: ED, emergency department.

The proportion of patients with ≥1 inpatient visit was comparable among non-Hispanic White (60.2%) and non-Hispanic Black patients (60.6%), but higher (71.1%) among patients in the other race/ethnicity category ($P < 0.001$) (Figure 5). Non-Hispanic Black patients had the highest proportion of patients with ≥1 ED visit during the follow-up period, and non-Hispanic White patients were most likely to have ≥1 outpatient visit.

Patients insured by Medicaid were significantly more likely to be hospitalized for any reason compared to those with Medicare (Figure 6). The proportion of patients with ≥1 ED visit was also highest in those with Medicaid coverage. Patients with Medicaid at the index date had statistically significantly higher odds of hospitalization compared to each of the other insurance
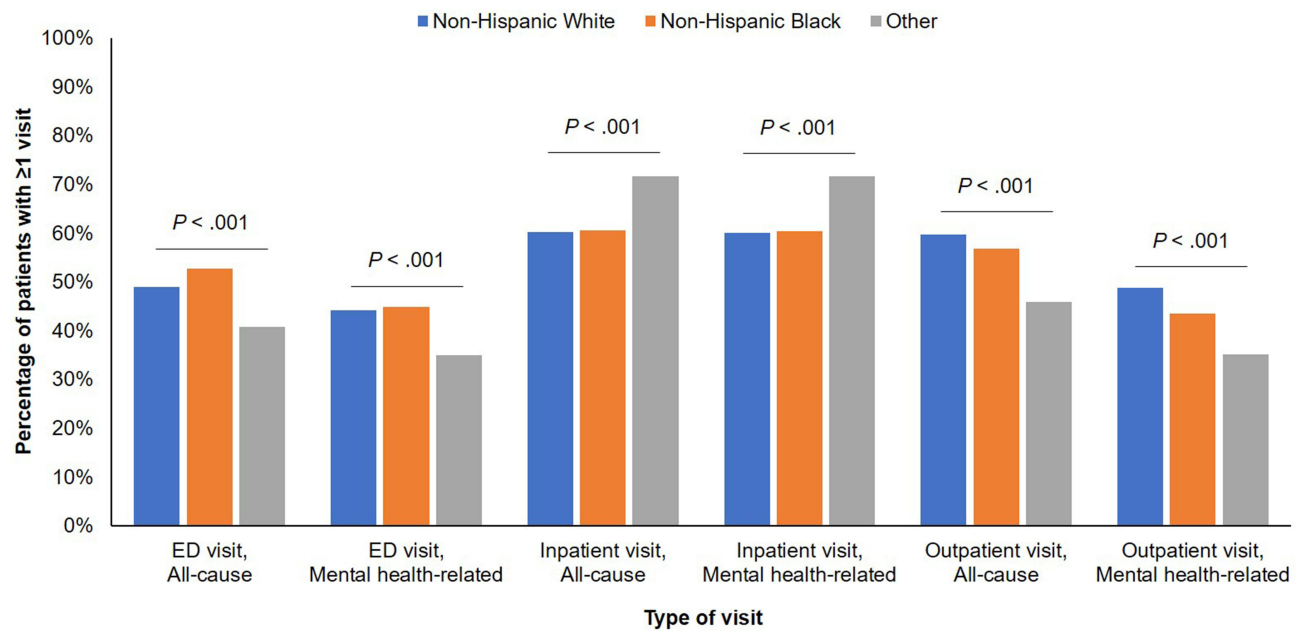
Figure 5 Healthcare resource utilization in the 12-month follow-up period by race/ethnicity.
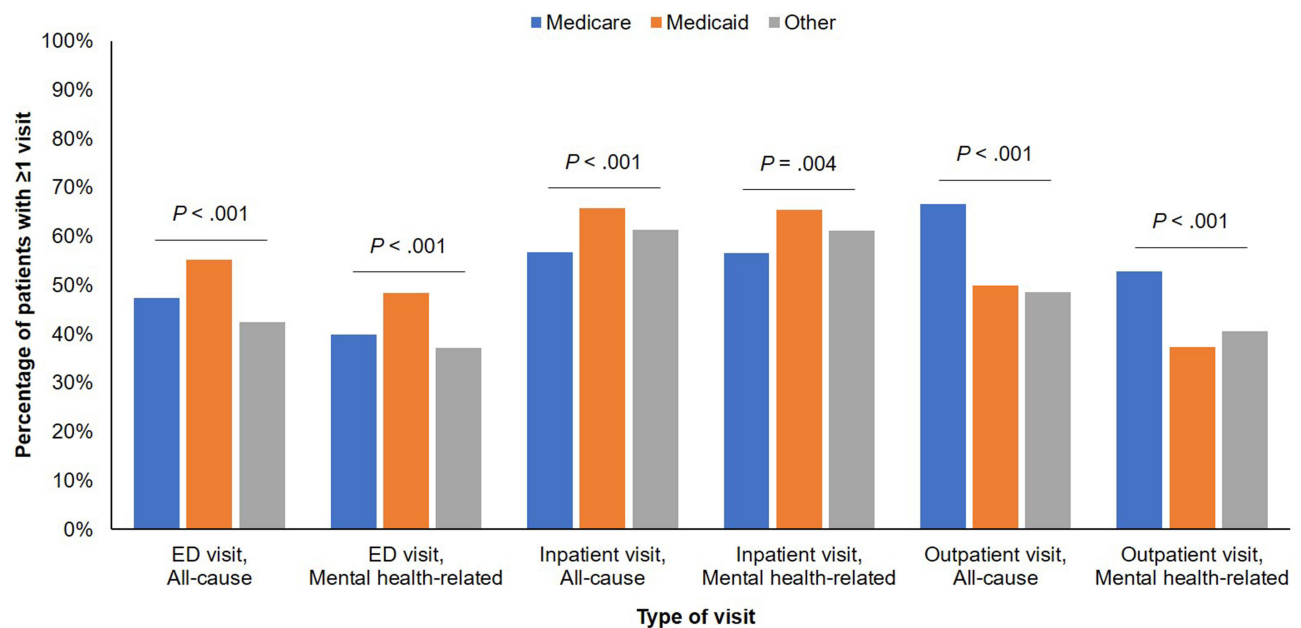**Abbreviations**: ED, emergency department.

Figure 6 Healthcare resource utilization in the 12-month follow-up period by type of insurance coverage.
Abbreviations: ED, emergency department.

coverage groups. Compared to patients with Medicaid at index, the odds of hospitalization were 31% lower (OR: 0.69 [95% CI: 0.63–0.75]; $P < 0.001$) among patients with Medicare at index and 17% lower (OR: 0.83 [95% CI: 0.73–0.94]; $P = 0.005$) among patients with other insurance at index (Supplemental Table 1). Controlling for age, the adjusted odds of hospitalization were 26% lower among patients with Medicare vs patients with Medicaid (OR$_a$: 0.74 [95% CI: 0.68–0.82]; $P < 0.001$) and 22% lower among patients with other insurance compared to patients with Medicaid (OR$_a$: 0.78 [95% CI: 0.69–0.89]; $P < 0.001$). Similar results were observed after controlling for both age and race/ethnicity and for ED visits (see Supplemental Table 1). The reverse

pattern occurred for outpatient visits, wherein patients with Medicare had a 42% to 99% greater odds of outpatient visits than patients with Medicaid ($P < 0.001$).

Discussion

The results of this study highlight health disparities in schizophrenia treatment and burden in an already-disadvantaged population. Utilization of SGA LAIs was low in the overall population and in each subgroup. All-cause and mental health-related inpatient and ED visits were most common in patients aged 18 to 24 years and those covered by Medicaid, whereas outpatient visits were more common in the older adults and those covered by Medicare.

Previous studies have revealed differences in treatment patterns and HRU in subgroups of patients with schizophrenia, particularly in relation to race and ethnicity. Using Medicaid data, Bareis et al[18] found that non-Hispanic White patients were less likely than in other racial/ethnic groups to utilize LAIs, a finding that is consistent with the current study. Also in a Medicaid population, Pesa et al[19] reported that Black patients were more likely than White patients to be treated with FGA LAI. Unlike the current study, older age in this population was found to be a predictor of FGA LAI utilization. Among New York state Medicaid beneficiaries, Normand et al[23] observed that the proportion of patients treated with an LAI was numerically greater for patients identifying as Black (25.5%) than those who identify as other race (22.8%), White (21.7%), or Latinx (19.0%). Within Medicaid populations, the relationship between race/ethnicity and use of LAIs is confounded by differences in state-level Medicaid coverage policies; patients living in a state with an active prior authorization policy for LAIs were nearly 60% less likely to receive an LAI compared to those without such a policy.[27] Using data from an integrated, community-based health system, Alavi et al[20] identified non-White race as a predictor of greater odds for LAI use, whereas age ≥40 years was a predictor of lower odds for LAI use. Race/ethnicity has also been found to influence HRU, with Mahabaleshwarkar et al[24] reporting that a greater proportion of non-Hispanic Black patients with schizophrenia had a 30-day follow-up visit after a hospitalization, ED visit, and mental health specialist visit during follow-up compared with non-Hispanic White patients. These investigators also observed that older patients had fewer ED and mental health specialist visits and were less likely to be treated with LAIs or SGAs than younger patients.

Use of SGA LAIs has been associated with improved adherence and reduction in hospitalizations, ED visits, and healthcare costs compared to oral antipsychotics.[28–31] In the recently updated guidelines for the treatment of schizophrenia published by the American Psychiatric Association, LAI antipsychotic medication is advocated if patients prefer such treatment or if they have a history of poor or uncertain adherence.[32] Underutilization of SGA LAIs in this study is consistent with previous studies; the percentage of patients receiving any SGA LAI was 9% among Medicaid beneficiaries in 2018 and 14% among fee-for-service Medicare beneficiaries in 2019.[30,33] Notably, in our dataset FGA LAI use was greater than that of SGA LAI, despite the latter being a preferred option in many clinical scenarios.[34] Coverage policies are unlikely to be responsible for the underuse of SGA LAIs in this study, as Medicaid preferred drug lists for Maryland, Virginia, and DC include multiple SGA LAIs, and antipsychotics are among six "protected classes" in Medicare and are protected from utilization management policies.[35–37] Clinician knowledge of treatment options and patient acceptability of LAIs are commonly cited as barriers, along with practical aspects of treatment administration.[38–43] Another possible barrier that may have influenced utilization in the current study was the COVID-19 pandemic, which may have limited access to injection facilities, thus inhibiting LAI initiation.

An estimated 382,000 ED visits related to schizophrenia occur each year in the United States, and one-third of them result in a hospitalization.[44] Medicaid is the predominant payer for ED visits related to schizophrenia, accounting for 40% of visits compared with 16% for no insurance, 15% for Medicare, and 15% for dual Medicare and Medicaid. In contrast, only 23% of non-schizophrenia-related ED visits are paid for by Medicaid, which is comparable to the 23% of non-schizophrenia visits with no insurance and lower than the 34% of these visits with private insurance. Patients with schizophrenia and other serious mental illnesses cite access to care as a significant barrier to regular medical care, and patients reporting delays in accessing care are significantly more likely to visit the ED compared to those not reporting such delays. Patterns of HRU in this study are consistent with national trends showing greater ED utilization in patients covered by Medicaid compared to those of other insurance types.[45,46] Medicaid coverage disruptions are common in this population and are associated with increased use of acute care services.[12] Poor adherence to antipsychotic medications

has been associated with increased use of emergency services,[47] further underscoring the importance of adherence in this population.

To our knowledge, this is the largest study to examine prescribing patterns and HRU in patients with schizophrenia in an IDN with a diverse patient population. A study conducted using EHR data from Atrium Health, an IDN with more than 900 care locations in North Carolina, South Carolina, and Georgia, included 2941 patients with a diagnosis of schizophrenia between January 2008 and June 2019.[24] Population characteristics were similar to this study in terms of age, race/ethnicity, and insurance type. The study found greater use of LAIs, more schizophrenia-related inpatient visits, and more ED visits in non-Hispanic Black patients compared to non-Hispanic White patients, but no subgroup analyses by insurance type were conducted. This study fills an important gap in the literature on the impact of insurance type on prescribing patterns and resource use in this population.

There were several limitations with our study. The study was conducted exclusively with EHR data from a single IDN based in the Washington, DC; Maryland; and Virginia metropolitan area. Therefore, the data might not be representative of other hospital networks or states with different Medicaid policies. Prescription data in EHR reflects prescriptions electronically submitted to pharmacies and do not indicate that the medication was received by the patient. EHR data within an IDN captures only encounters within that system. Loss to follow up due to mortality, relocation, or seeking care outside of network cannot be identified. Moreover, patients were not required to have a full 12 months of follow-up to be included in the analysis. Another consideration is that the COVID-19 US Public Health Emergency ran from March 2020 to January 2023, partially overlapping the study period and potentially impacting antipsychotic prescription/utilization and HRU. Lastly, the first observable diagnosis of schizophrenia (ie, the study index) is based on the first diagnosis that occurs within the study period, which cannot be interpreted as the patient's initial diagnosis of schizophrenia. Data, therefore, cannot distinguish between incident and prevalent diagnoses of schizophrenia. Although we do not have access to the date of first diagnosis or duration of disease information for the patients included in the analysis, we can make some assumptions based on the demographics. The study population was 56.3% male and the mean age was 46.0 (standard deviation, 16.0) years, with approximately 70% of patients aged 35 years or older and 53.6% aged 45 years or older. Given that schizophrenia is most commonly diagnosed when a patient is in their late teens to early 30s and tends to be diagnosed at a younger age in men versus women, we can infer that our study population was predominantly prevalent cases. As such, we would anticipate more frequent prescription of LAIs than if the population were predominantly incident cases. Interestingly, in our dataset the younger age groups, where one may reasonably expect more incident cases, were more likely to receive an FGA LAI or SGA LAI than the older age groups. Excluded from consideration in our study were patients receiving institutional long-term care; however, older data from state psychiatric facilities have also reported potential disparities in LAI use.[48]

In conclusion, the results of this study indicate overall underprescription/underutilization of antipsychotic medications, with particularly low use of SGA LAI medications, which have been shown to improve clinical and economic outcomes in patients with schizophrenia. Moreover, disparities in treatment selection and HRU were observed based on age, race/ethnicity, and/or insurance coverage—findings that may influence clinical outcomes for these patients. Education and removal of barriers to healthcare access and treatment are needed to ensure consistent quality of care and reduce the burden of disease in this vulnerable population.

Abbreviations

AP, antipsychotic; BMI, body mass index; CI, confidence interval; ED, emergency department; FGA, first-generation antipsychotic; FGA LAI, first-generation long-acting injectable; EHR, electronic health record; HRU, healthcare resource utilization; ICD-10-CM, International Classification of Diseases, 10th revision, clinical modification; IDN, integrated delivery network; LAI, long-acting injectable; OR, odds ratio; SGA, second-generation antipsychotic; SGA LAI, second-generation long-acting injectable.

Data Sharing Statement

The data used in this analysis are from a third-party, proprietary database; therefore, the data is not publicly available.

Ethics Approval and Informed Consent

This research was performed in accordance with the ethical principles set forth by the Declaration of Helsinki and in compliance with relevant data protection and privacy regulations. The study protocol was approved by the MedStar institutional review board and exempt from patient consent requirements.

Author Contributions

All of the authors made significant contributions to the work reported, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; have agreed on the journal to which the article was submitted; reviewed and approved manuscript versions during submission, revision, acceptance, and proof generation; and agree to take responsibility and be accountable for all aspects of the work.

Disclosure

Sanghyuk Seo is a former employee of Janssen. Bridget E Healey, Ronae McLin, and Naomi C Sacks are former employees of PRECISIONheor. Carmela J Benson is a current employee of Janssen. Leslie Citrome serves as consultant to AbbVie/Allergan, Acadia, Adamas, Alkermes, Angelini, Astellas, Avanir, Axsome, Biogen, BioXcel, Boehringer Ingelheim, Cadent Therapeutics, Cerevel, Clinilabs, COMPASS, Delpor, Eisai, Enteris BioPharma, HLS Therapeutics, Idorsia, INmune Bio, Impel, Intra-Cellular Therapies, Janssen, Karuna, Lundbeck, Luye, Lyndra, MapLight, Marvin, Medavante-ProPhase, Merck, Mitsubishi-Tanabe Pharma, Neumora, Neurocrine, Neurelis, Noema, Novartis, Noven, Otsuka, Ovid, Praxis, Recordati, Relmada, Reviva, Sage, Sumitomo/Sunovion, Supernus, Teva, University of Arizona, Vanda, Wells Fargo, and one-off ad hoc consulting for individuals/entities conducting marketing, commercial, or scientific scoping research; is a speaker for AbbVie/Allergan, Acadia, Alkermes, Angelini, Axsome, BioXcel, Eisai, Idorsia, Intra-Cellular Therapies, Janssen, Lundbeck, Neurocrine, Noven, Otsuka, Recordati, Sage, Sunovion, Takeda, Teva, and CME activities organized by medical education companies such as Medscape, NACCME, NEI, Vindico, and Universities and Professional Organizations/Societies; owns stocks (small number of shares of common stock) in Bristol-Myers Squibb, Eli Lilly, J & J, Merck, Pfizer purchased >10 years ago, stock options: Reviva; and receives royalties/publishing income from Taylor & Francis (Editor-in-Chief, *Current Medical Research and Opinion*, 2022-date), Wiley (Editor-in-Chief, *International Journal of Clinical Practice*, through end 2019), UpToDate (reviewer), Springer Healthcare (book), Elsevier (Topic Editor, *Psychiatry, Clinical Therapeutics*). The authors report no other conflicts of interest in this work.

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