The Association Between Race, Social Determinants of Health, and Treatment for Major Depressive Disorder (MDD) in a Real-World Cohort

Jessica K. Paulus, ScD; Geoff Severtson, PhD; Xi Qian, PhD; Pam Kumparatana, MPH; Veena Hoffman, MPH; Zhaohui Su, PhD; Carl Marci, MD | OM1, Inc, Boston, MA, USA

Disclosures

This study was initiated and internally funded by OM1, Inc. Dr. Paulus, Dr. Severtson, Ms. Kumparatana, Ms. Hoffman, Dr. Su, and Dr. Marci are employees of OM1, Inc. Dr. Qian was an employee of OM1, Inc. at the time of study conduct. Dr. Marci is also affiliated with Massachusetts General Hospital and Harvard Medical School.

Background

The relationships between race/ethnicity, social determinants of health and major depressive disorder (MDD) are complex. There is growing interest in understanding the role that social determinants of health, including financial assets, have in contributing to disparities in MDD burden[1,2].

Objective

To describe the associations between race and household income and measures of MDD burden in a large U.S.-based real-world cohort of black and white patients with MDD.

Methods

Study Design

- Retrospective observational cohort study during the study period of March 2015 – February 2020

Data Source

- OM1 PremiOM™ MDD Dataset (previously the OM1 MDD Registry) and social determinants of health data in the OM1 Real-World Data Cloud (OM1, Inc., Boston, MA, USA), a US real-world data network with linked healthcare claims and electronic medical records (EMR) data from multiple speciality providers, including OM1's Mental Health Network of 2.5+ million patients seen in 2,000+ community-based practices.

Inclusion Criteria

- ≥ 2 diagnosis codes for MDD and available social determinants of health data during the study period (index date = first date of MDD diagnosis)
- ≥ 6 months of baseline data prior to the index date
- ≥ 18 years of age on the index date

Study Variables

- Patient age, race, sex, insurance type, education, household income were assessed at the index date.
- Baseline Patient Health Questionnaire-9 (PHQ-9) scores (as available) were assessed within the three months prior to or on the index date. PHQ-9 scores were assessed as a continuous variable and by the following categories of depression severity: None/Minimal (0-4), Mild (5-9), Moderate (10-14), Moderately Severe (15-19), and Severe (≥ 20).
- PHQ-9 scores were assessed during the 18 months after the index date
- Mental health care-related visits and antidepressant prescriptions were assessed during the 12 months after the index date

Analytic Methods

- In subgroups of MDD patients defined by race and income, median PHQ-9 scores (as available) and number and percent of patients with mental health care visits and antidepressant prescriptions were assessed in the 18 months after index.
- Multiple imputation by fully conditional specification was used to handle missing PHQ-9 scores.
- Generalized estimating equations with a binomial distribution and logit link assuming an autoregression correlation structure were used to compare PHQ-9 scores over time.

Results

- The study included 123,966 black patients (76% female, median age 52 years) and 1,087,579 white patients with MDD (69% female, median age 57 years) (**Table 1**).
- For patients with available PHQ-9 at index, the median score for black patients was higher than for white patients (10.8 vs 8.8; P < .0001) (**Table 2**).
- The mean PHQ-9 for patients with incomes < $25K was higher than for patients with incomes ≥ $25K (9.7 vs 8.9; p =0.006).
- Emergency care (2,358 [1.9%] vs 10,481 [1.0%] p < .0001) and inpatient mental health care use (10,555 [8.5%] vs 56,020 [5.2%]; p < .0001) was higher in black patients, while outpatient mental health visits were lower (29,008 [23.4%] vs. 268,622 [24.7%]; p < .0001) (**Table 3**).
- Prescription fills for antidepressant therapy in the 12 months after index were significantly lower for black versus white patients (0.9 vs 1.2; p <.0001) (**Table 3**).
- Disadvantages in PHQ-9 score by race and income at index persist over the course of follow-up time (18 months) (**Figures 1-4**).

Conclusions

- In a real-world cohort of patients with MDD, black race and socioeconomic disadvantage were associated with multiple measures of increased MDD burden.
- Racial and income inequalities in MDD severity at diagnosis are persistent over time.
- Improving access to outpatient mental health care may increase opportunities for more effective treatment of depressive symptoms to improve differential outcomes and reduce racial disparities in MDD.

Table 1. Sociodemographic Characteristics of the MDD Cohort by Race

	White (N = 1,087,579)	Black (N = 123,966)	Total (N = 1,211,545)
Sex, n (%)			
Female	748,538 (68.8%)	93,643 (75.5%)	842,181 (69.5%)
Age, Median (Q1-Q3)	57 (43-68)	52 (38-62)	56 (42-68)
Ethnicity (n, %)			
Hispanic	35,290 (4.2%)	1,499 (1.5%)	36,789 (3.9%)
Non-Hispanic	814,175 (95.8%)	96,626 (98.5%)	910,801 (96.1%)
Unknown	238,114	25,841	263,955
Insurance status, n (%)			
Commercial	574,104 (52.8%)	71,606 (57.8%)	645,710 (53.3%)
Medicaid	63,724 (5.9%)	15,790 (12.7%)	79,514 (6.6%)
Medicare	197,277 (18.1%)	16,717 (13.5%)	213,994 (17.7%)
Education, n (%)			
Less than high school	16,200 (1.5%)	3,240 (2.6%)	19,440 (1.6%)
High school degree	455,417 (42.4%)	58,846 (47.9%)	514,263 (42.9%)
Some College	41,855 (3.9%)	6,595 (5.4%)	48,450 (4.0%)
Vocational/Tech	11,352 (1.1%)	916 (0.7%)	12,268 (1.0%)
Bachelor Degree	442,064 (41.1%)	43,441 (35.3%)	485,505 (40.5%)
Graduate Degree	108,468 (10.1%)	9,883 (8.0%)	118,351 (9.9%)
Estimated Household Income ($), Median (Q1-Q3)	57,500 (38,000 – 84,000)	50,000 (31,000 – 68,000)	57,000 (37,000 – 83,000

Table 2. Baseline PHQ-9 Scores in the MDD Cohort by Race

	White (N = 1,087,579)	Black (N = 123,966)	Total (N = 1,211,545)
PHQ-9 score, continuous			
N	7,832	883	8,715
Mean (SD)	8.8 (6.9)	10.8 (7.1)	9.0 (6.9)
Median (Q1-Q3)	8 (3-14)	11 (5-16)	8 (3-14)
PHQ-9 score, by category of depression severity			
None/Minimal (0-4)	2,601 (33%)	207 (23%)	2,808 (32%)
Mild (5-9)	1,865 (24%)	177 (20%)	2,042 (23%)
Moderate (10-14)	1,622 (21%)	215 (24%)	1,837 (21%)
Moderately Severe (15-19)	1,115 (14%)	173 (20%)	1,288 (15%)
Severe (≥ 20)	629 (8%)	111 (13%)	740 (9%)
Unknown	1,079,747	123,083	1,202,830

Table 3. Mental Health Care-Related Visits and Antidepressant Prescriptions in the MDD Cohort During the 12 Months Post-Index Date by Race

	White (N = 1,087,579)	Black (N = 123,966)	Total (N = 1,211,545)
Any mental health care-related visits, n (%)	315,505 (29%)	38,254 (31%)	353,759 (29%)
Any mental health care-related emergency care visit, n (%)	10,481 (1%)	2,358 (2%)	12,839 (1%)
Any mental health care-related outpatient visits, n (%)	268,622 (25%)	29,008 (23%)	297,630 (25%)
Any mental health care-related inpatient visits, n (%)	56,020 (5%)	10,555 (9%)	66,575 (6%)
Number of antidepressant prescription fills, Mean (SD)	1.2 (3.0)	0.9 (2.7)	1.2 (3.0)

Figure 1. Median PHQ-9 score at the Index date and 6-, 12-, and 18-Months Post-Index Date by Race

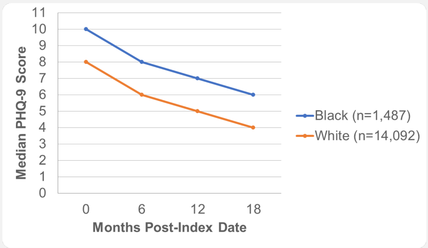


Figure 2. Patients With Moderately Severe to Severe MDD (PHQ-9 ≥ 15) at the Index Date and 6-, 12-, and 18- Months Post-Index Date by Race

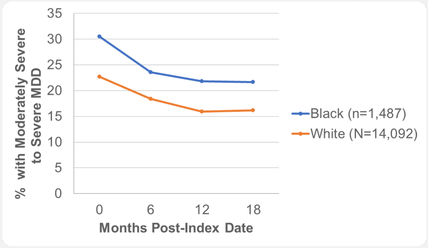


Figure 3. Patients With Moderately Severe to Severe MDD (PHQ-9 ≥ 15) at the Index Date and 6-, 12-, and 18- Months Post-Index Date by Household Income (N = 15,578)

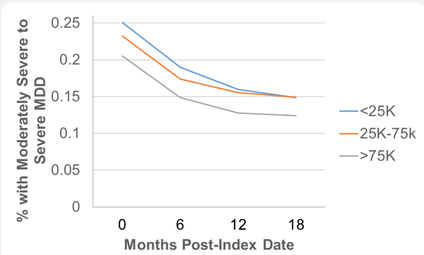
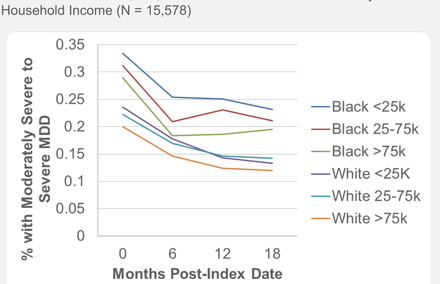


Figure 4. Patients With Moderately Severe to Severe MDD (PHQ-9 ≥ 15) at the Index Date and 6-, 12-, and 18- Months Post-Index Date by Race and Household Income (N = 15,578)



Conference

Presented at the 38th International Conference on Pharmacoepidemiology & Therapeutic Risk Management. August 24-28, 2022. Copenhagen, Denmark.

References

1. Ettman CK, et al.. Do assets explain the relation between race/ethnicity and probable depression in U.S. adults? PLoS One. 2020;15(10):e0239618.
2. Center for Behavioral Health Statistics and Quality. (2021). Racial/ethnic differences in mental health service use among adults and adolescents (2015-2019) (Publication No. PEP21-07-01-002). Rockville, MD: Substance Abuse and Mental Health Services Administration.