

REAL-WORLD TREATMENT MODALITIES AND COSTS AMONG COMMERCIALY INSURED US PATIENTS WITH NEWLY DIAGNOSED MAJOR DEPRESSIVE DISORDER

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Background

- > Major depressive disorder (MDD) is one of the most prevalent mental health disorders in the United States (US) and is frequently associated with psychiatric conditions, multiple impacts on health status including reduced quality of life, and increased risk of death.^{1,2}
- > Treatment guidelines for MDD recommend pharmacologic and non-pharmacologic therapies tailored to a patient's disease severity, comorbid health conditions, preferences, and cost concerns.^{3,4}
- > To date, few studies have examined real-world treatment patterns, healthcare resource utilization (HCRU), and healthcare costs among patients with MDD, and those that have focused on examining the role of antidepressant treatment without examining the role of non-pharmacologic therapy alone or in combination with antidepressant therapy.^{5,6}

Objective

To examine associations with real-world treatment modality including both antidepressant and non-pharmacologic treatments and explore the relationship between treatment modality and patient outcomes such as HCRU, healthcare costs, and disease severity.

Methods

Study Design and Patient Selection

- > Commercially insured US patients, ages 18-62 years with newly diagnosed MDD between 01/01/2017 and 09/30/2019, were retrospectively identified from the HealthCore Integrated Research Database (HIRD®). The earliest MDD diagnosis date was set as the index date.
- > Eligible patients were continuously enrolled in the health plan for one year before the index date (baseline period) and two years after (post-index period). Patients whose pharmacy benefit was carved out, resulting in missing cost data, were excluded.
- > Those with schizophrenia, bipolar disorder, postpartum depression, substance use disorder, and prior pharmacologic or non-pharmacologic treatments for MDD were excluded.
- > The full study protocol is available through the Real-World Evidence Registry: <https://osf.io/yq6b3>.

Outcomes

- > Patients were categorized into one of four treatment modalities based on antidepressant and non-pharmacologic treatment utilization in the post-index period.
 - > Antidepressant treatment only (Rx-only)
 - > Non-pharmacologic treatment only (non-Rx-only)
 - > Both antidepressant and non-pharmacologic treatment (combination)
 - > No treatment (no treatment)
- > Antidepressants included selective serotonin reuptake inhibitors (SSRIs), serotonin norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), serotonin modulators and stimulants (SMSs), bupropion, mirtazapine, esketamine, and ketamine.
- > All-cause HCRU (inpatient stays, emergency room visits, and outpatient visits) and costs (reported in 2021 US dollars [USD]) were assessed during the post-index period by treatment modality.
- > Changes in MDD severity were assessed by ICD-10-CM codes. Index severity was assessed between the index date and 30 days post index. Post-index severity changes were assessed between day 31 and 730. After comparing the initial and last severity assessment available, patients were categorized as having no change, worsened, or improved severity.

Statistical Analysis

- > Demographics, clinical characteristics, treatment patterns, HCRU, and healthcare costs were presented using descriptive statistics.
- > Multinomial logistic regression was used to identify associations between baseline patient/provider characteristics and treatment modality (Rx-only, non-Rx-only, combination) compared to the reference category of no treatment.
- > Multivariable logistic regression was used to identify associations between baseline patient/provider characteristics, treatment modality, and change in severity assessment (improved severity vs. no change or worsened severity).
- > Bi-directional stepwise regression models were used to select variables to be included in the models. For entry and stay in the model, explanatory variables had to have p-values ≤ 0.25 . Age and sex were retained in all models regardless of significance. A threshold of $p < 0.05$ was used to define statistical significance.
- > Analyses were conducted using Instant Health Data (Panalgo, Cambridge, MA) and SAS Enterprise Guide 8.3 (Cary, NC).

Figure 1. Patient identification

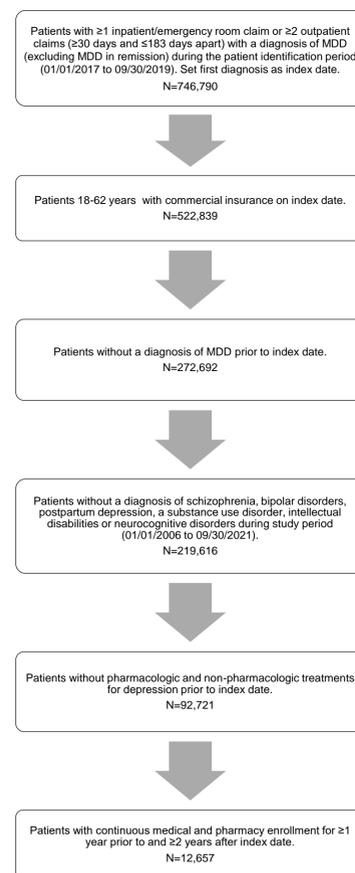


Table 1. Baseline demographic and clinical characteristics

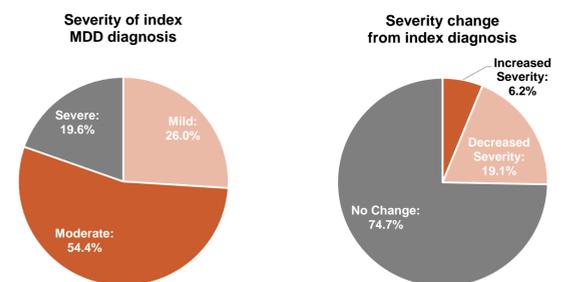
- > In total, 12,657 patients met selection criteria with a mean age of 35.6 years and 60% female.
- > Most were diagnosed with MDD by a primary care physician (PCP; 36%) or non-physician clinician (34%), and most (86%) were diagnosed in an outpatient setting.

Demographic and Clinical Characteristics	MDD Cohort (N=12,657)
Age on index (years), mean (SD)	35.6 (12.8)
Female, n (%)	7,609 (60.1%)
Health plan type, n (%)	
Health Maintenance Organization (HMO)	2,908 (23.0%)
Preferred Provider Organization (PPO)	7,093 (56.0%)
Consumer Driven Health Plan (CDPH)	2,656 (21.0%)
Patient residence, n (%)	
Northeast	1,862 (14.7%)
Midwest	3,843 (30.4%)
South	3,920 (31.0%)
West	2,687 (21.2%)
Urban, n (%)	8,639 (68.3%)
≥12 months of follow-up during the COVID-19 pandemic, n (%)	2,336 (18.5%)
Quartiles of socioeconomic status (SES), n (%)	
1 (Low SES)	1,990 (15.7%)
2	3,032 (24.0%)
3	3,549 (28.0%)
4 (High SES)	3,888 (30.7%)
Specialty of diagnosing provider associated with index claim, n (%)	
Psychiatrist	1,114 (8.8%)
Primary care physician	4,526 (35.8%)
Non-physician clinician	4,281 (33.8%)
Psychologist	963 (7.6%)
Nurse practitioner	1,081 (8.5%)
Physician assistant	247 (2.0%)
Licensed clinical social worker	1,702 (13.5%)
Other	289 (2.3%)
Emergency medicine	695 (5.5%)
Other/Missing/Unknown	2,041 (16.1%)
Location of index claim, n (%)	
Inpatient	899 (7.1%)
Emergency room	878 (6.9%)
Outpatient	10,880 (86.0%)
Quan-Charlson Comorbidity Index, mean (SD)	0.18 (0.59)

a. Indicator for patients who have follow-up time that occurs during the COVID-19 pandemic using March 2020 as the start date in the United States. Those who have an index date on or after March 2019 had at least 12 months of follow-up time during the COVID-19 pandemic.
 b. The socioeconomic status (SES) index is a composite measure based on seven variables from the 2017 American Community Survey.

Figure 2. MDD severity (N=6,444)

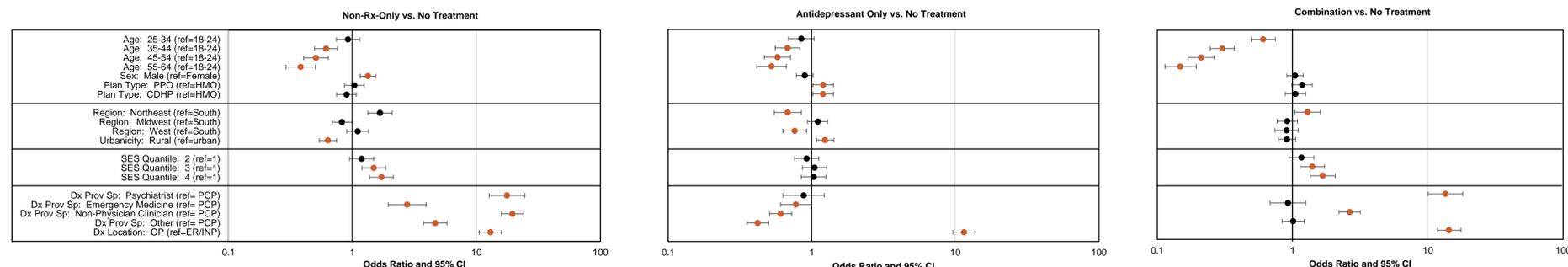
- > In total, 6,444 (51%) patients had MDD severity specified on their index diagnosis claim with 26% coded as having mild MDD, 54% having moderate MDD, and 20% having severe MDD.
- > Most (76%) patients did not change severity between the index and last specified severity; however, 18% improved severity while 6% worsened severity.



Results

Figure 3. Adjusted multinomial regression model assessing associations between treatment modality and patient characteristics (N=12,147)

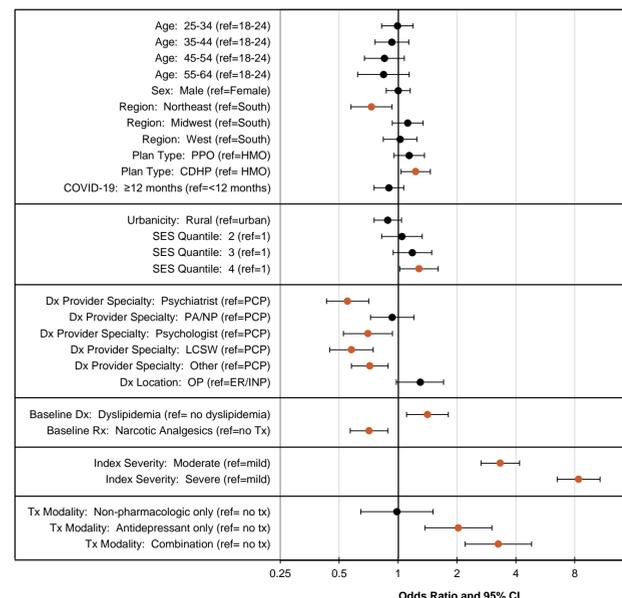
- > Among MDD patients, 34% received Rx-only, 25% received non-Rx only, 28% received combination treatment, and 13% received no treatment.
- > In multinomial logistic regression, age, sex, patient residence, socioeconomic status, diagnosing provider specialty, and initial diagnosis location were significantly associated with treatment modality ($p < 0.05$).



Abbreviations: CDPH= consumer driven health plan; CI= confidence interval; Dx= diagnosing; ER= emergency room; HMO= health maintenance organization; INP= inpatient; OP= outpatient; PCP= primary care physician; PPO= preferred provider organization; Prov= provider; ref= reference; Rx= pharmacologic; SES= socioeconomic status; Sp= specialty. Note: Orange circles indicate odds ratio is statistically significant ($p < 0.05$). Covariates of baseline comorbidities (anxiety, dysthymia, and hypertension) and baseline medication use (glucocorticoids, narcotic analgesics, and non-narcotic analgesics) are not shown on the forest plot for readability. Hosmer and Lemeshow Goodness-of-Fit Test: $p < 0.001$.

Figure 4. Adjusted logistic regression model assessing associations between severity improvement and patient characteristics (N=6,184)

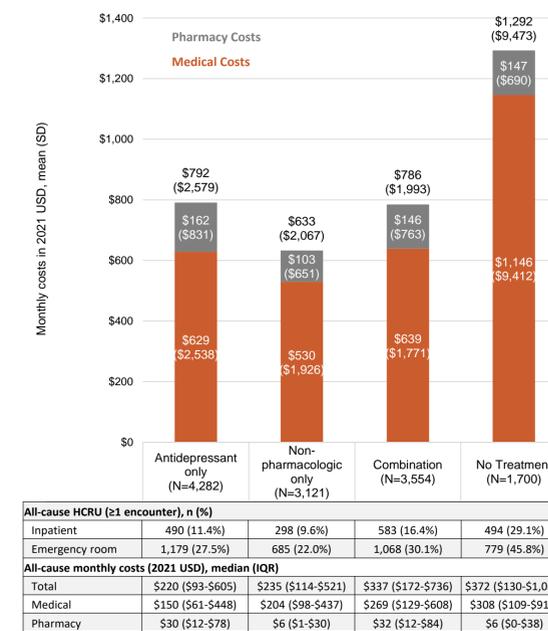
- > In multivariable logistic regression, those who received Rx-only (Odds Ratio [OR]: 2.03; 95% Confidence Interval [CI]: 1.37-3.02) or combination treatment (OR: 3.26; 95% CI: 2.20-4.82) were significantly more likely to decrease MDD severity than those who received no treatment.



Abbreviations: CDPH= consumer driven health plan; CI= confidence interval; COVID-19= coronavirus 2019; Dx= diagnosis; ER= emergency room; HMO= health maintenance organization; INP= inpatient; LCSW= licensed clinical social worker; NP= nurse practitioner; OP= outpatient; PA= physician's assistant; PCP= primary care physician; PPO= preferred provider organization; ref= reference; Rx= pharmacologic; SES= socioeconomic status; Tx= treatment. Note: Orange circles indicate odds ratio is statistically significant ($p < 0.05$). Hosmer and Lemeshow Goodness-of-Fit Test: $p = 0.567$. C-statistic: 0.611.

Figure 5. Post-index (2 years) HCRU and costs by treatment modality

- > The proportions of patients with ≥ 1 post-index all-cause inpatient hospitalization were 11%, 10%, 16%, and 29%, for those with Rx-only, non-Rx-only, combination, and no treatment, respectively.
- > All-cause total mean monthly post-index costs were \$1,292 in the no treatment group, and \$792, \$633, and \$786 for those in the Rx-only, non-Rx-only, and combination treatment groups, respectively.



Conclusions

- > We observed variations in HCRU and healthcare costs by treatment modality and associations between treatment modality and improvements in MDD severity.
- > Improving access to depression treatment, both antidepressant and non-pharmacologic options, could further improve outcomes for patients with MDD.
- > Further research assessing the role of non-pharmacologic treatment such as timing, duration, and intensity of services in relation to antidepressant treatment and its association with HCRU and healthcare costs using real-world data could help inform treatment decisions and improve outcomes for patients living with MDD.

Limitations

- > Administrative claims are collected for the purpose of payment and not research; they may be subject to coding issues and may not reflect a member's full treatment history.
- > This study was exploratory, and the reported associations should not be interpreted as causal effects.
- > The treatment modality analysis did not consider intensity of treatment or examine whether patients who received combination treatment did so concurrently.
- > Results may not be generalizable to patients who have a different insurance type or are uninsured.

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Disclosures

LNP, YY, and MG are employees of HealthCore, Inc., which received funding from the Innovation and Value Initiative for the conduct of the study on which this abstract is based. MG is a shareholder of Evidence Health. RX and RC are employees of the Innovation and Value Initiative.



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