Prevalence and Costs of Difficult-to-Treat Depression in a Canadian Claims Database

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Abstract

Background: Difficult-to-treat (DTT) depression includes patients who are less likely to respond to conventional antidepressant therapy due to treatment-resistant depression (TRD), bipolar depression, and/or psychotic depression. Recent evidence indicates that patients with TRD utilize more health care services than non-TRD patients. However, little is known about the health care costs associated with DTT depression.

Objective: To identify DTT depressed patients—including those diagnosed with psychotic depression, bipolar depression or patients identified as likely to have TRD—and provide a descriptive analysis—including demographics and patterns of medical care utilization for DTT depressed patients and non-DTT depressed patients.

Methods: We identified patients with a claim for the diagnosis of major depressive disorder (ICD-9 codes 296, 309, or 311) between January 1, 1996 and December 31, 1998 (N=36,611) using the Saskatchewan Health databases. After excluding patients with comorbid psychosis, patients whose depression was untreated, and patients who were less severely depressed, treatment algorithms were applied to classify depressed patients as DTT and non-DTT. Demographics, resource utilization, and costs were compared between the two groups.

Results: We identified 1,825 (13%) DTT depressed patients. DTT depressed patients had significantly higher annualized costs and resource utilization than non-DTT depressed patients for all measured outcomes. The median annualized costs per patient for hospital, physician, and prescription services were CAD$2,073 for DTT depressed patients and CAD$1,005 for non-DTT depressed patients. The median number of medical claims per patient for the first year of follow-up was 56 for DTT and 32 for non-DTT depressed patients. DTT depressed patients had significantly more physician visits and hospitalizations and a longer median length of stay (4.5 vs. 3 days).

Conclusion: DTT depressed patients consume significantly more medical resources and have higher medical costs associated with their treatment than non-DTT depressed patients. Successful treatment of DTT depression may reduce treatment costs and medical resource consumption.

Introduction

- Major depressive disorder (MDD) is one of the most common forms of psychiatric illness.
- Significant health care costs are associated with treating depression.[1]
- Research efforts have recently focused on trying to better define patients with difficult-to-treat (DTT) depression.
- Rush, et al. (2003) define this group as patients who are not responsive to optimally delivered antidepressant therapy, as well as those who do not receive the optimal delivery of treatment due to a variety of circumstances (e.g., nonadherence, intolerable side effects).
- Thase (2003) defines DTT depression as depression with a variety of complicating factors (anxiety, psychoses, and bipolar disorders) that make depression difficult to treat.
- We defined DTT depressed patients as those who are less likely to respond to conventional antidepressant therapy due to treatment-resistant depression (TRD), bipolar depression, and/or psychotic depression. TRD includes patients with MDD who fail to achieve remission despite adequate antidepressant therapy.[4]
- Although TRD, bipolar, and psychotic depression populations have been examined individually, DTT depressed patients have not been well studied as a group.

Objective

The purpose of this retrospective study is to describe the demographics, health care utilization, and costs for patients with DTT depression.

Methods

Study Description
- **Design**: Retrospective cohort study
- **Data Source**: Data sources used for this study were the population registry, prescription, hospital services, and physician services databases from Saskatchewan Health (SH).[5]
- **Study Population**: Figure 1 illustrates how the study sample was selected.

Figure 1. Identification of the Study Sample
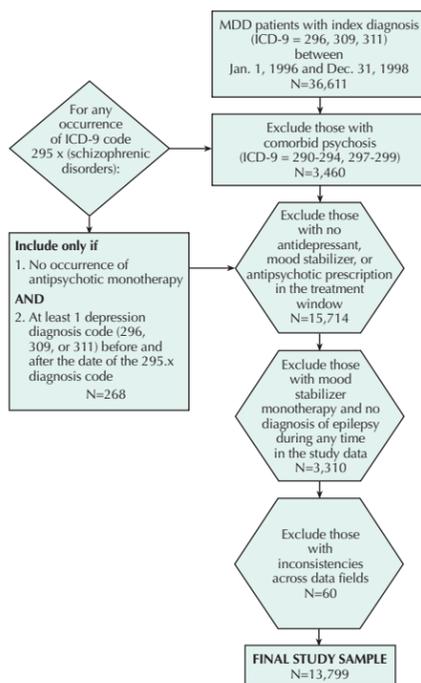
Determination of DTT

DTT status was determined by reviewing a patient's medical claims history for the 3-year period following his or her treatment start date (defined as date of first antidepressant, antipsychotic, or mood stabilizer therapy within the treatment window).

- DTT depressed patients were defined as those who
    - Had received electroconvulsive therapy at any time during follow-up (N=14), or
    - Were identified as having bipolar depression based on a diagnosis or on treatment patterns (N=482), or
    - Were identified as having psychotic depression based on treatment patterns (N=485), or
    - Were identified as likely to have TRD (N=898) (Figure 2).

Methods (continued)

Figure 2. Treatment-Resistant Depression Algorithm
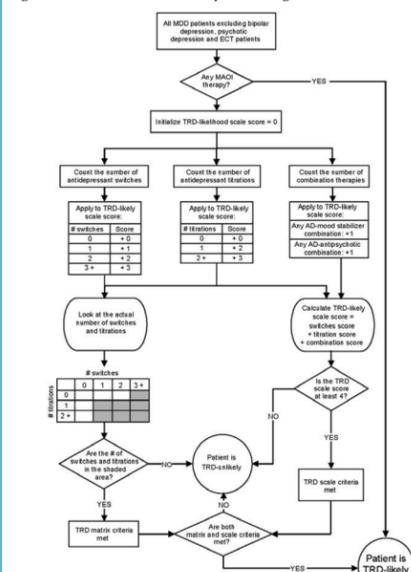
Abbreviations: MAOI = monoamine oxidase inhibitor, AD = antidepressant

- All MDD patients who were not identified as DTT by any of the previous criteria were classified as non-DTT depressed patients.

Determination of Resource Utilization and Costs
- **Hospitalization Costs**: Estimated by multiplying the resource intensity weight (RIW) by an estimated cost per weighted case.
    - RIW is assigned by SH to each hospital separation based on the discharge diagnosis and procedures performed in the hospital. This value enables us to estimate the cost associated with a given hospitalization.
    - The estimated cost per weighted case is calculated by SH based on available acute care funding for a given year divided by the total number of weighted cases for that year.
    - Average length of hospital stay: total days in the hospital divided by the number of admissions.
- **Physician Services Costs**: The amount paid multiplied by the appropriate Canadian Consumer Price Index (CPI) factor.
- **Prescription Costs**: The total prescription cost multiplied by the appropriate CPI factor.
- **Annualized Costs**: All annualized costs were derived for the first year of follow-up for patients who had at least 90 days of follow-up. Annualized costs were determined for each patient as the patient's daily cost of treatment (for a given service) multiplied by 365 days.
- **Daily Cost of Treatment**: Total cost of treatment during the first year of follow-up divided by the number of days the patient was followed during the period (i.e., 365 days for patients with a full year of follow-up, 90 to 364 days for patients who terminated early).
- Number of claims (for all services), hospital admissions, and physician visits were reported from all patients during the first year of follow-up.

Analysis
- Statistical tests were conducted to compare the DTT and non-DTT groups in resource utilization and costs.
    - Patient demographics and health care utilization for each group were examined.
    - For categorical variables, chi-square tests were used to assess the statistical significance.
    - For continuous variables, wilcoxon tests were used to assess the statistical significance.
    - All analyses were performed using SAS software version 8 (SAS Institute, Cary, NC, USA).

Results

Demographics
Table 1 presents demographic information for both DTT and non-DTT populations.

Table 1. Demographic Characteristics for DTT and non-DTT Populations

Demographic Characteristic	DTT N=1,825 n (%)	Non-DTT N=11,974 n (%)	Total N=13,799 n (%)
Age			
18–34	508 (28)	3,711 (31)	4,219 (31)
35–44	443 (24)	3,132 (26)	3,575 (26)
45–54	328 (18)	2,111 (18)	2,439 (18)
55–64	176 (10)	1,232 (10)	1,408 (10)
65+	370 (20)	1,788 (15)	2,158 (16)
Gender			
Male	691 (38)	3,966 (33)	4,657 (34)
Female	1,134 (62)	8,008 (67)	9,142 (66)
Marital Status*			
Never married	375 (21)	2,267 (19)	2,642 (19)
Married	1,000 (55)	6,727 (56)	7,727 (56)
Divorced/Separated/ Widowed	450 (25)	2,978 (25)	3,428 (25)
Residential Status			
Rural	656 (36)	4,721 (39)	5,377 (39)
Urban	1,169 (64)	7,253 (61)	8,422 (61)

*Missing marital status for 2 patients.

Antidepressant Utilization
Figure 3 presents the significant differences in frequency of antidepressant use. Miscellaneous antidepressants included trazodone, amitriptyline/ perphenazine, nefazodone, venlafaxine, mirtazapine, and bupropion.

Figure 3. Frequency of Antidepressant Use by Class
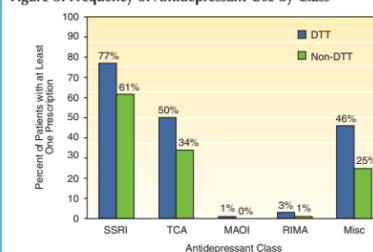
Abbreviations: SSRI = selective serotonin uptake inhibitor, TCA = tricyclic and tetracyclic antidepressants, MAOI = monoamine oxidase inhibitor, RIMA = reversible inhibitor of monoamine oxidase–type A, Misc = Miscellaneous.

Results (continued)

Health Care Utilization and Costs
- Significantly more DTT depressed patients than non-DTT depressed patients had
    - At least one hospitalization (30% vs. 15%)
    - A physician service (100% vs. 99%).
    - A non-antidepressant prescription (95% vs. 84%).
- Average number of claims for all medical services in the first year of follow-up:
    - DTT depressed patients: 70 claims
    - Non-DTT depressed patients: 42 claims.
Table 2 presents the annualized costs of services per patient during the first year of follow-up.

Table 2. Summary Statistics for Annualized Costs of Services per Patient During the First Year of Follow-up

Service/ DTT Status	N	Mean [$] (SE)	Median [$] (min/max)	p-value*
Hospital				
DTT	530	10,049 (714)	4,605 (423/148,351)	<.0001
Non-DTT	1,754	8,750 (563)	3,220 (419/568,354)	
Physician				
DTT	1,812	1,462 (45)	871 (0/29,995)	<.0001
Non-DTT	11,865	847 (13)	473 (0/50,505)	
Prescriptions				
DTT	1,812	1,047 (30)	742 (9/29,309)	<.0001
Non-DTT	11,865	570 (7)	345 (1/27,037)	
All Services				
DTT	1,812	5,448 (276)	2,073 (39/164,739)	<.0001
Non-DTT	11,865	2,710 (96)	1,005 (4/570,855)	

*p-value for mean

- DTT depressed patients had significantly more hospitalizations (p<.0001) and physician visits (p<.0001) than non-DTT depressed patients.
- 11% of DTT depressed patients had at least two hospital admissions compared to only 5% of non-DTT depressed patients (Figure 4).

Figure 4. Frequency of Hospital Admissions per Patient
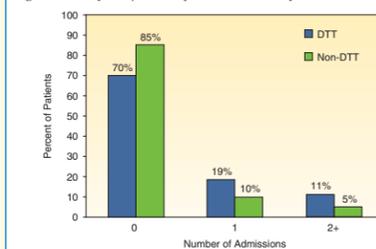
- Significant difference in median length of hospitalization stay:
    - DTT depressed patients: 4.5 days
    - Non-DTT depressed patients: 3 days
- 13% percent of the DTT depressed patients had more than 30 physician visits compared to 4% of the non-DTT depressed patients (Figure 5).

Figure 5. Number of Physician Visits per Patient
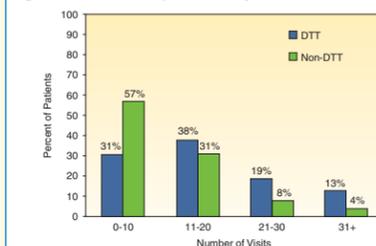
Limitations

The following are several limitations inherent in using the SH administrative data for research:[5]
- Services and costs associated with non-physician health care professionals were not available.
- Some services provided by contract psychiatrists are not captured in the physician services data.
- Only 3-digit ICD-9 codes for one diagnosis per visit are available in the physician services file, so we cannot distinguish unipolar claims (296.20–296.36) from bipolar claims (296.40–296.89).
- Finally, as with any claims database there is the possibility of inaccuracies as a result of data entry errors.

Conclusions

First retrospective analysis to examine the resource utilization and costs for DTT depressed patients compared to non-DTT depressed patients.
- DTT depressed patients consume significantly more medical resources and have higher medical costs for all types of services (hospital, physician and prescription) than non-DTT depressed patients.
- Our findings are consistent with the current research on TRD, which suggests that treatment of TRD patients is very costly and TRD patients utilize more health care services.[6,7]
- In this study, we identified 1,825 (13%) patients that had DTT depression.
- The total estimated cost for treatment and management of DTT depressed patients was CAD$9.9 million (24% of the costs associated with treating all MDD patients).
- Thus, successful treatment of DTT depression may reduce treatment costs and medical resource consumption.

Conflict of Interest

Employees and consultants of Eli Lilly and Company contributed significantly to the design and analysis plan for this study. Analysis was conducted by employees of RTI International, a nonprofit research organization. The study was fully funded by Eli Lilly and Company.

References

1. Corey-Lisle PK, Birnbaum HG, Greenberg PE, et al. Economic Impact of Olanzapine Plus Fluoxetine Combination Therapy Among Patients Treated for Depression: A Pilot Study. *Psychopharmacology Bulletin* 2003;37(3):90–98.
2. Rush, AJ, Thase ME, Dube S. Research issues in the study of difficult-to-treat depression. *Biol Psychiatry* 2003;53:743–753.
3. Thase ME. New approaches to managing difficult-to-treat depression. *J Clin Psychiatry* 2003;64(suppl 1):3–4.
4. Fava M. Diagnosis and definition of treatment-resistant depression. *Biol Psychiatry* 2003;53:649–659.
5. Downey W, Beck P, McNutt M, et al. Health Databases in Saskatchewan. In: Strom BL ed. *Pharmacoepidemiology*. Third Edition. Chichester: Wiley, 2000; 325–345.
6. Corey-Lisle PK, Birnbaum HG, Greenberg PE, et al. Identification of a claims data "signature" and economic consequences for treatment-resistant depression. *J Clin Psychiatry* 2002 Aug;63(8):717–726.
7. Crown WH, Finkelstein S, Berndt ER, et al. The Impact of Treatment-Resistant Depression on Health Care Utilization and Costs. *J Clin Psychiatry* 2002;63:963–971.