Decision Factors Relating to Prescribing Disease-Modifying Therapies: Prediction of Adherence Behavior in Patients With Multiple Sclerosis

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OBJECTIVE
- To explore potential predictive factors associated with suboptimal disease-modifying therapy (DMT) adherence in patients with MS

INTRODUCTION
- Strong evidence indicates that patients with chronic diseases, such as MS, have difficulty adhering to their prescribed DMT1-3
- The World Health Organization defines adherence to long-term therapy as ‘the extent to which a person's behavior—taking medication, following diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a health provider’4
- In MS patients, adherence varies widely, ranging from 20% to 80%, based on population characteristics and the provided DMT4
- An analysis of a large commercial claims database found that suboptimal medication adherence in MS patients negatively impacts patient outcomes and may increase total annual medical care costs5
- Factors predicting patient adherence behavior may impact the selection of therapeutic approach for the treatment of MS, including the choice of escalation or induction paradigm6

METHODS

Patients and Study Design
- Observational, cross-sectional retrospective study of patient-reported outcomes (PROs) obtained over 4 years from patients with MS in the course of routine clinical care at the Comprehensive Multiple Sclerosis Care Center at South Shore Neurologic Associates
- Patients completed computerized cognitive testing (CCT), questionnaires of patient-reported disease progression, and medication adherence questionnaires between May 2013 and May 2017
- Patients who were receiving DMT at the time of CCT were included in the analysis
- Patients also had to complete both the adherence and disease progression questionnaires at the time of standardized CCT
- Patients also had to discontinue DMT, or had not initiated DMT at the time of CCT, and patients receiving infused DMT were excluded

Assessments
- Standardized, validated CCT (NeuroTrax)9
- Expanded Creativity Status Scale (SCS)10
- PROs
  - Beck Depression Index11
  - Morisky Medication Adherence Scale (MMAS-8)13,14
  - Clinical Outcomes Research Initiative (ClinOutcomes)15
- No. of previous DMTs
- Male, female, age, marital status, employment, driving status

RESULTS

Disease Progression
- A total of 499 patients met the inclusion criteria (76% female; average age: 49 years)
- Of those, 114 (41.8%) reported high adherence, 83 (30.0%) reported moderate adherence, and 77 (28.2%) reported low adherence regarding their behavior toward treatment, including their currently prescribed DMT (Figure 1)

Outcomes in Patients With Varying Levels of DMT Adherence
- Demographic data of patients with low, moderate, or high DMT adherence through 4 years are shown in Table 1
- Significantly more older patients and men showed high DMT adherence
- EDSS scores, number of previous DMTs, marital or employment status, and driving capability were similar in all adherence groups
- Global cognitive score was similar in all adherence groups (Figure 2)
- Patients with high DMT adherence reported significantly lower scores in depression, fatigue (cognitive, physical and psychosocial functioning) and functional scale (Figure 3)

CONCLUSIONS
- This observational, real-world study of patients with MS found that lower DMT adherence was associated with higher depression and fatigue, whereas higher adherence was associated with older age and male gender
- Our findings agree with the results from a recent retrospective database study of patients with MS, showing that male gender and older age were significantly associated with higher likelihood of adherence, while depression was associated with lower adherence16
- Patient-centric factors related to predicted adherence behavior of self-administered medications may impact efficacy and disease-associated outcome17

Figure 1. Adherence Levels

Patients Who Met the Inclusion Criteria (N=499)

Figure 2. Cognitive Testing Outcomes

Low Adherence (N=77)
Moderate Adherence (N=83)
High Adherence (N=113)

Scores (mean, 95% CI)

Table 1. Demographic Data and Clinical Characteristics

Parameter | Low Adherence (N=77) | Moderate Adherence (N=82) | High Adherence (N=113) | P valuea,b
---|---|---|---|---
Age, years | 46.0 (12.0) | 49.7 (12.6) | 51.3 (10.9) | *0.0109
Male, n (%) | 12 (15.6) | 17 (20.7) | 36 (31.6) | 0.0288
Married, n (%) | 39 (51.3) | 45 (56.3) | 75 (68.2) | 0.0521
No. of previous DMTs | 0.9 (1.1) | 0.9 (1.4) | 0.8 (1.0) | 0.7915
Clinical Outcome (SCS) | 16.7 (2.5) | 16.4 (2.4) | 16.6 (2.3) | 0.7816
EDSS score | 3.8 (1.0) | 3.9 (1.0) | 3.9 (1.0) | 0.8301
Global cognitive | 30.5 (5.9) | 30.8 (6.0) | 30.8 (5.9) | 0.8876
Depression | 18.9 (11.9) | 18.9 (11.9) | 18.9 (11.9) | 0.9875
Fatigue | 16.2 (10.0) | 16.2 (10.0) | 16.2 (10.0) | 0.9875
Physical function | 0.5 (0.2) | 0.5 (0.2) | 0.5 (0.2) | 0.8554
Back pain and stiffness | 0.5 (0.2) | 0.5 (0.2) | 0.5 (0.2) | 0.8554
Cognitive function | 0.5 (0.2) | 0.5 (0.2) | 0.5 (0.2) | 0.8554
Motor function | 0.5 (0.2) | 0.5 (0.2) | 0.5 (0.2) | 0.8554

a, b Values are mean (SD) unless indicated otherwise

Predictors of DMT Adherence
- An ordinal logistic regression model was used to measure the association between adherence and the assessed covariates (Figure 4)
- Older age (P=0.013) and male gender (P=0.021) were associated with higher adherence
- Depression and fatigue (P=0.032 and P=0.022, respectively), were associated with low adherence
- No relationship between adherence categories and EDSS score, driving capability, employment status, number of prior DMTs, and marital status was observed

Figure 4. Logistic Regression Association Between Adherence and Various Covariates

DML Globala Valueb

Odds Ratio (95% CI)a

(a) Odds ratio for concerning variable. (b) P value for linearity

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References

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