

Impact of Medication Adherence on Clinical and Economic Outcomes in Multiple Sclerosis: A Scoping Review of Real-World Evidence

Trent Bishop¹, PharmD/MBA 2028 Candidate; Aaron B. Mendelsohn², PhD, MPH; Catherine M. Lockhart, PharmD, PhD³

¹UNC Eshelman School of Pharmacy, Chapel Hill, NC, United States: ²AMCP BBCIC, Alexandria, VA, United States: ³AMCP Research Institute, Alexandria, VA, United States



Background

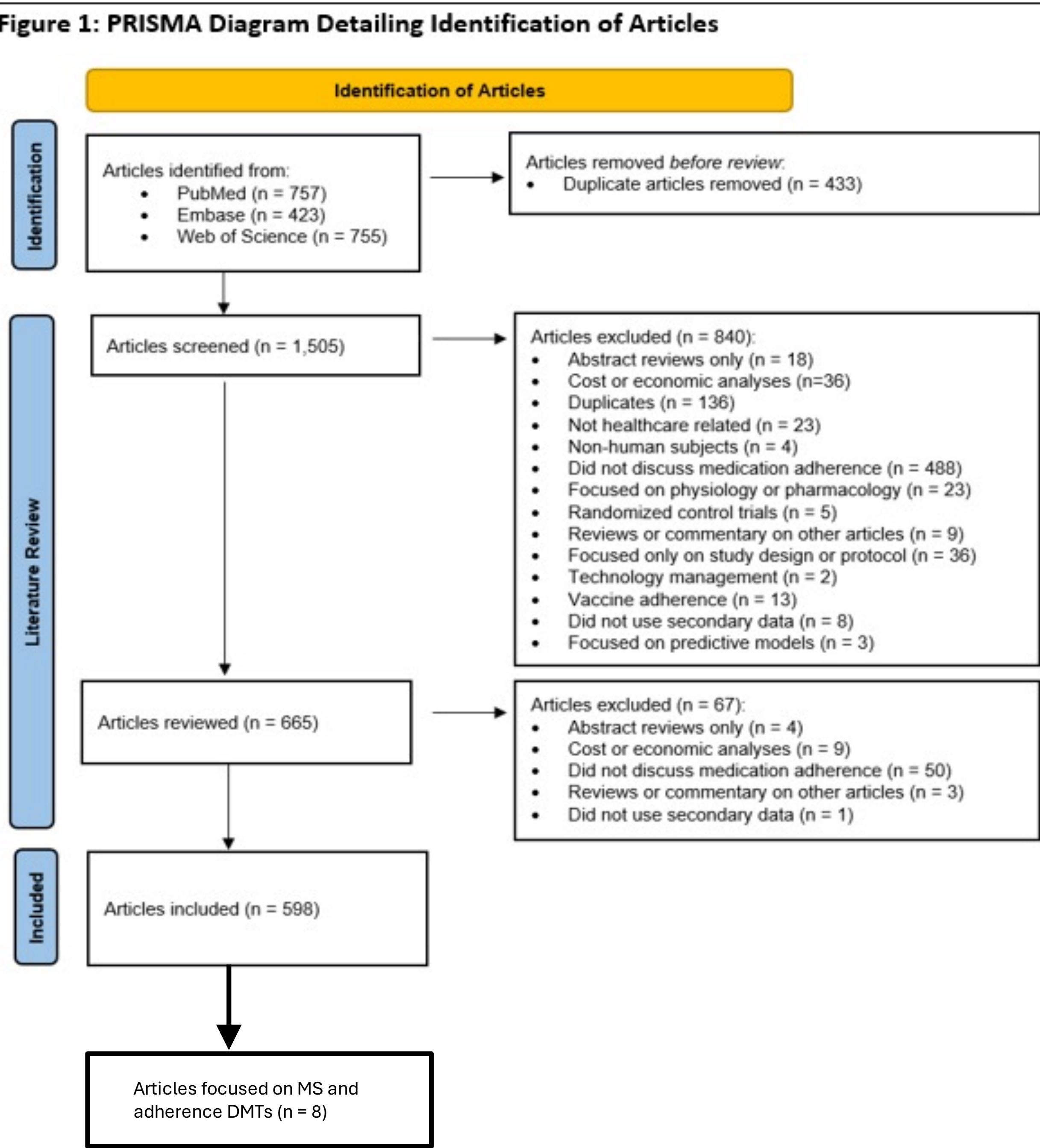
- Adherence to disease-modifying therapies (DMTs) is essential for improving outcomes in multiple sclerosis (MS), a chronic immune-mediated neurological condition.
- Real-world data can be used to evaluate adherence impacts on relapse rates, disability progression, and healthcare resource utilization outside of controlled clinical trials.
- Although adherence is widely recognized as important, a synthesis of its measurable real-world impact in MS has been limited.
- This scoping review summarizes the current landscape of real-world studies evaluating the association between adherence to DMTs and clinical and economic outcomes

Purpose

- To evaluate the impact of adherence to MS therapies on outcomes and costs using real-world data within a broader scoping review.

Methods

- A scoping review of studies on medication adherence or persistence using real-world secondary data (administrative claims or electronic medical records).
- Articles were identified from PubMed, EMBASE, and Web of Science using the terms compliance, adherence, administrative claims, real-world, observational.
- Of 1,505 articles retrieved, 596 met inclusion criteria, with 8 focused on MS and adherence DMTs.
- These MS studies reported associations with relapse rates, hospitalizations, healthcare costs, and work productivity.



Results

Variable	Persistent vs Nonpersistent
Resource category # of outpatient visits - General practitioner visits - Psychiatric specialist visits - Other specialist visits # of hospital admissions - Days in hospital # of drug prescriptions # of occupational therapy prescriptions	4.13 (<0.001) 0.01 0.39 3.80 (<0.001) -0.02 -1.34 10.56 (<0.001) 0.85
Cost Category, € - Outpatient care - Inpatient care - Pharmaceuticals - Occupational therapy - Rehabilitation - Overall	119.72 (<0.001) -532.11 54.35 (<0.001) 156.90 13.91 -187.23 (<0.001)

Table 1. Mean differences in healthcare utilization and costs between persistent and nonpersistent multiple sclerosis patients from baseline to 12 months. Persistent patients had more outpatient and specialist visits and filled more prescriptions compared with nonpersistent patients. Despite higher outpatient and pharmacy utilization, overall healthcare costs were €187 lower at 12 months for persistent patients, driven by markedly lower inpatient costs (–€532 ; p < 0.001). Adapted from **Evans, C.**¹

- Across multiple real-world datasets, adherence to DMTs in MS was consistently associated with improved clinical and economic outcomes.
- Patients with high adherence, defined as a medication possession ratio (MPR) or proportion of days covered (PDC) of at least 80%, experienced 29 percent fewer relapses and a 37 percent lower risk of hospitalization compared with non-adherent patients.⁶
- High adherence was also associated with lower annual MS-related healthcare costs, with adherent patients averaging \$3,380 per year compared with \$4,348 per year for non-adherent patients.⁶
- Persistence with specific DMTs, including fingolimod and natalizumab, was linked to sustained reductions in relapse rates and continued cost savings over time.^{2,5}
- For every 10 percent increase in adherence, patients had up to a 19 percent reduction in emergency room visits and inpatient hospital stays, as well as a 3 to 8 percent reduction in work loss and other indirect costs.⁷

Parameter	GA N = 575		DMF N = 608		TER N = 370	
	High Adherence N = 352	Low Adherence N = 223	High Adherence N = 394	Low Adherence N = 214	High Adherence N = 259	Low Adherence N = 111
MS-related HRU						
Hospitalizations n (%) Mean (SD)	97 (27.6) 0.6 (1.1)	82 (36.8) 0.8 (1.3)	105 (26.7) 0.7 (1.3)	72 (33.6) 0.8 (1.4)	47 (18.2) 0.4 (1.0)	35 (32.4) 0.8 (1.5)
Outpatient visits n (%) Mean (SD)	351 (99.7) 18.5 (10.8)	220 (99.7) 20.4 (12.9)	394 (100) 19.4 (9.5)	211 (98.6) 20.8 (12.7)	259 (100) 24.9 (12.2)	111 (100) 22.2 (11.0)
Sick leave n (%) Mean (SD)	85 (24.2) 8.6 (33.0)	64 (28.7) 19.8 (70.7)	83 (21.1) 8.1 (39.0)	49 (22.9) 8.8 (34.2)	59 (22.8) 11.0 (47.6)	20 (18.0) 7.1 (31.2)
Prescriptions for aids and remedies Mobility Devices n (%)	12 (3.4)	12 (5.4)	8 (2.0)	<5 (-)	10 (3.9)	6 (5.4)
Remedies n (%) Mean (SD)	106 (30.1) 1.4 (3.0)	77 (34.5) 1.6 (3.3)	127 (32.2) 1.4 (2.8)	70 (32.7) 1.3 (3.0)	99 (38.2) 1.6 (2.7)	45 (40.5) 2.2 (4.4)
MS-related costs, mean/patient/year (SD) €						
Total cost	19,378 (3344)	13,063 (11,242)	18,406 (3205)	11,976 (10,939)	17,411 (3466)	11,622 (9705)
Hospitalization costs	515 (1924)	1407 (3904)	422 (1675)	1051 (2613)	400 (2006)	1305 (5440)
Prescription costs (index DMT)	17,424 (2185)	5899 (3812)	16,531 (2066)	4727 (4299)	15,368 (1983)	5795 (3710)
Prescription cost (other)	201 (502)	263 (500)	217 (522)	284 (625)	296 (606)	357 (643)
Outpatient costs	802 (548)	848 (678)	754 (401)	833 (572)	855 (464)	852 (530)
Aids and remedies	242 (474)	314 (635)	288 (575)	275 (701)	325 (551)	426 (847)
Sick leave	86 (864)	619 (3686)	95 (799)	87 (870)	162 (1207)	140 (1330)

Table 2. Post-index multiple sclerosis-related healthcare resource utilization and costs by adherence to index disease-modifying therapy (DMT). Across glatiramer acetate (GA), dimethyl fumarate (DMF), and teriflunomide (TER) cohorts, high adherence (MPR ≥ 80%) was associated with lower hospitalization rates, fewer inpatient days, and reduced total annual costs compared with low adherence. Highly adherent patients incurred greater prescription and outpatient costs, reflecting ongoing therapy use, but demonstrated overall lower total MS-related costs primarily due to fewer hospitalizations and shorter sick-leave durations. Adapted from **Ziemssen, T.**⁸

Limitations

- Observational real-world designs are subject to bias and confounding.
- Definitions of adherence and persistence varied across studies (e.g., MPR vs PDC).
- Only 8 MS-specific studies were identified, highlighting the limited amount of real-world research available in this area.
- Limited data on newer DMTs and long-term persistence outcomes.

Conclusion

- Adherence and persistence to DMTs in MS are consistently linked to improved clinical outcomes and lower healthcare and societal costs, with several studies showing statistically significant benefits.
- These findings highlight the importance of adherence-focused interventions.
- The results also provide valuable real-world evidence to guide payers, providers, and policymakers.

Acknowledgements

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