

# Do Oral Disease Modifying Agents (DMTs) Improve Adherence to MS Treatment? A Comparison of Oral and Injectable Drugs.



## BACKGROUND

Lack of adherence to treatment, particularly with injectable medications, has been a significant problem in multiple sclerosis and estimated to occur in 20-50% of patients with consequent increase in relapse rate and disease progression. In recent years, therapeutic options for MS have expanded to include three oral options. The impact of oral DMTs in improving adherence to MS treatment is not well known.

## OBJECTIVES

To determine if adherence and tolerability of oral DMTs is better than with injectables in our MS Center population.

## METHODS

We developed the MS Treatment Adherence Questionnaire (MS-TAQ) and collected data from October-November 2014 (Fig. 1). The MS-TAQ is composed of 6 questions related to a patient's current DMT: number of missed doses in 4 weeks, reason dose was missed, perceived side effects, ease of administration, and medication satisfaction. Medication types were divided into 3 groups: subcutaneous or intramuscular (SC/IM), monthly IV injections, and oral DMTs. We analyzed the responses using Fisher's Exact Test ( $\alpha=0.05$ ) to determine if responses varied by medication type.

Figure 1: Multiple Sclerosis Treatment Adherence Questionnaire (MS-TAQ)

- Which of the following are you currently taking to treat your MS? Circle your answer:  

Aubagio 14 mg	Avonex 30 mcg	Belaseron 25 mcg
Copaxone 20 mg	Copaxone 40 mg	Gilenya 0.5 mg
Plegridy 125 mcg	Rebif 22 mcg	Rebif 44 mcg
Tecfidera 240 mg	Tysabri 300 mg	
- How many doses do you think you missed or forgot in the last 4 weeks? Circle your answer:  

0 missed doses	1-3 missed doses	4-6 missed doses
7-9 missed doses	10 or more missed doses	
- If you missed a dose last month, why did you miss a dose? Circle all that apply:  

Too busy	Side effects
Did not feel it was helping	Do not feel like you need to take a MS medicine
Need help administering medicine	Traveling without access to medicine
Anxiety or fear of taking medicine	Do not like the medicine
Tired of taking the medicine	Forgot to take the medicine
Cost of the medication	
- During the past 4 weeks, what side effects have you experienced from your medication? Circle all that apply:  

No side effects to my medicine	Redness, lumps, or pain on skin	Flushing of face or arms	Heart racing
Constipation	Abdominal pain	Nausea (upset stomach)	Headache
Diarrhea	Other side effects	Double or blurry vision	Vomiting
			Abnormal lab results
- On a scale from 1-5, how easy or hard do you feel it is for you to take your MS medicine?  

1	2	3	4	5
Very easy	Easy	Neutral	Difficult	Very difficult
- How satisfied are you with your medication treatment during the last 4 weeks?  

1	2	3	4	5
Not satisfied	Somewhat satisfied	Moderately satisfied	Very satisfied	Completely satisfied

Figure 2: Breakdown of Medication types

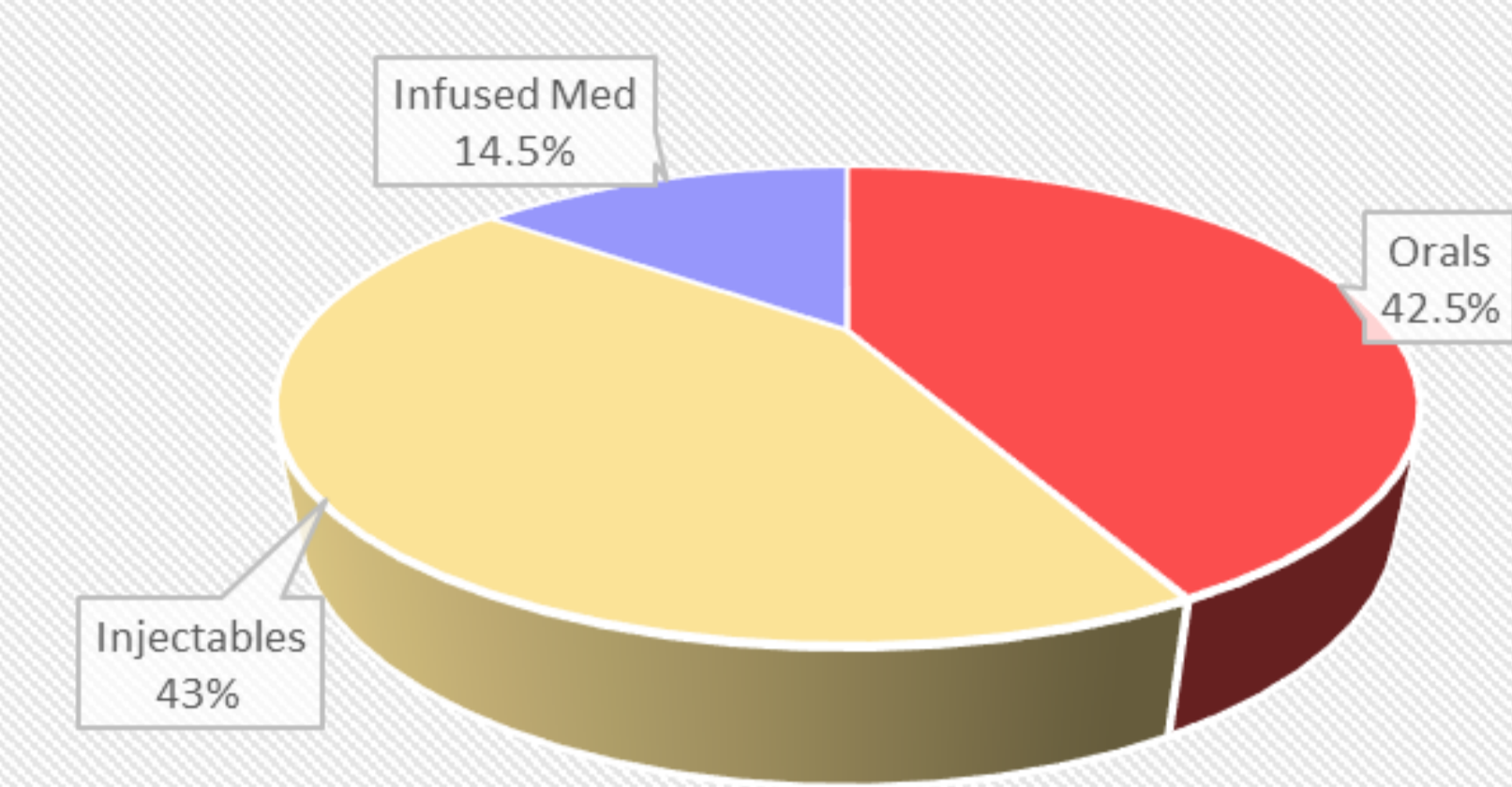


Figure 3: Missed Doses

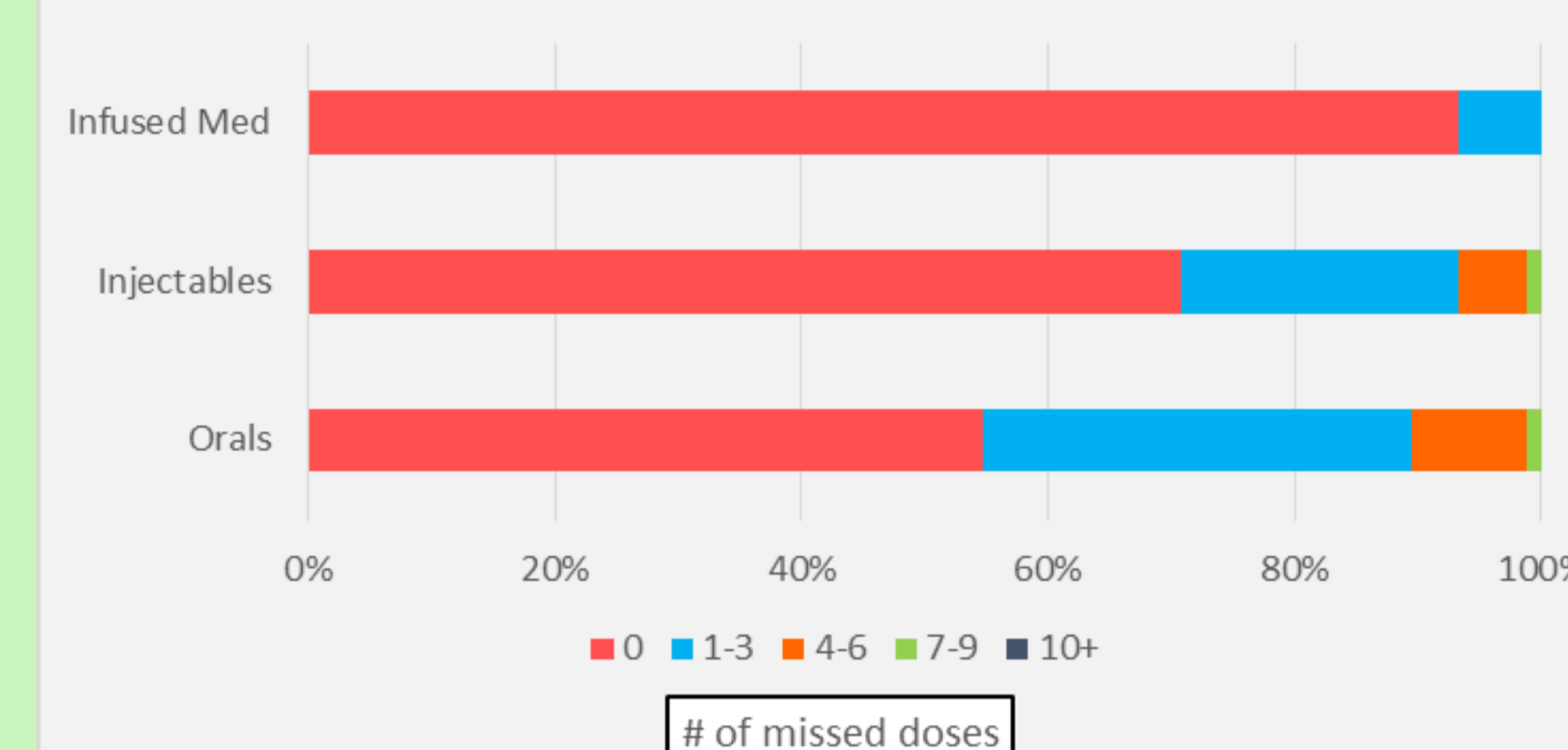


Figure 4: Ease of Taking Medication

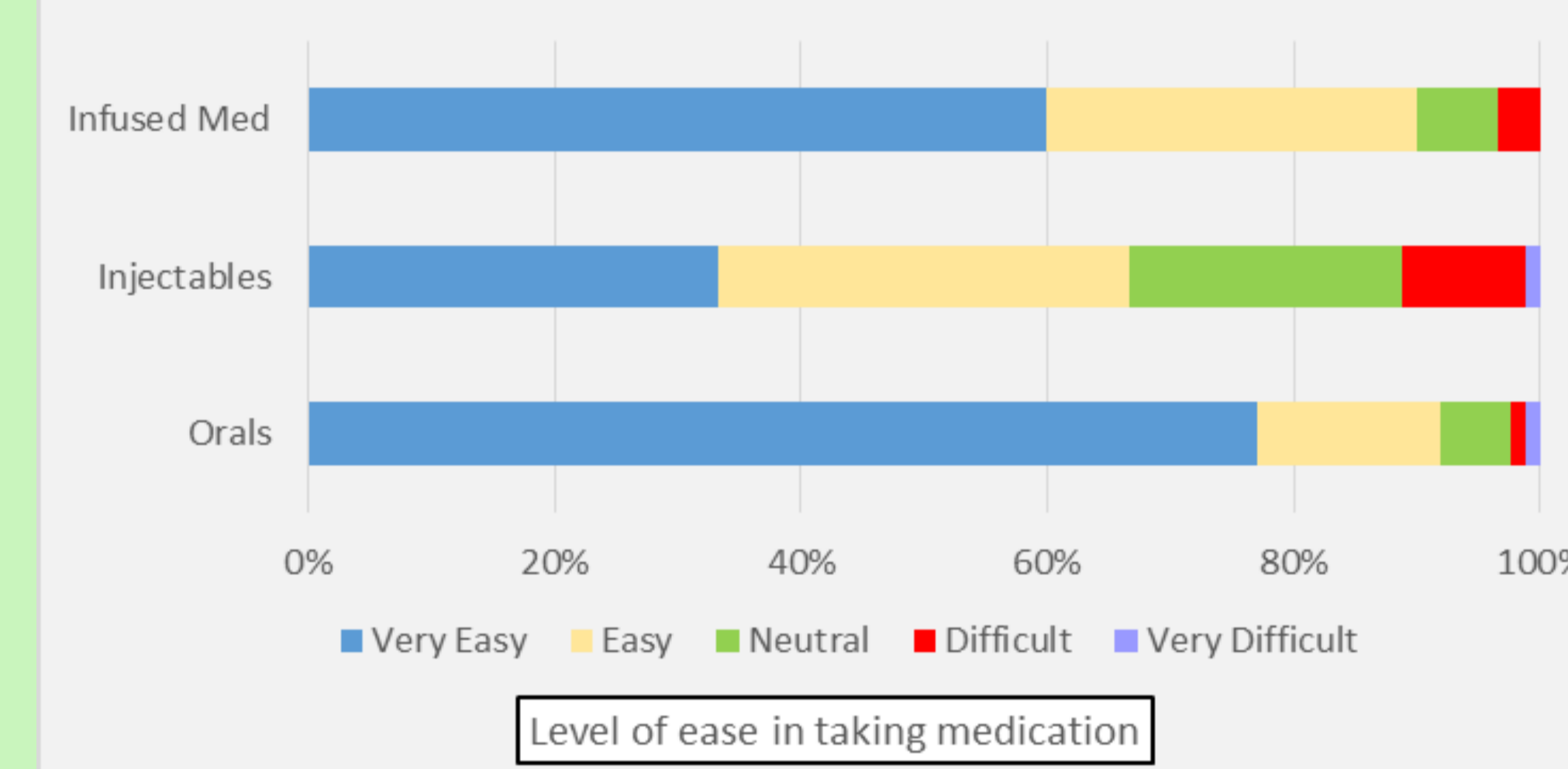


Table 1: Reason for Missed Dose and Medication Type

Reason	Type of Medication, n (%)		
	Orals	Injectables	Infused Med
Not Applicable <sup>1,2</sup>	47 (50.24%)	60 (69.77%)	29 (96.67%)
Too busy	3 (3.23%)	1 (1.16%)	0 (0%)
Did not feel it was helping	0 (0%)	0 (0%)	0 (0%)
Needed help administering	0 (0%)	1 (1.16%)	0 (0%)
Anxiety	1 (1.08%)	2 (2.33%)	0 (0%)
Tired of taking med	1 (1.08%)	1 (1.16%)	0 (0%)
No need	1 (1.08%)	0 (0%)	0 (0%)
Traveling without access	2 (2.15%)	2 (2.33%)	0 (0%)
Do not like it	1 (1.08%)	2 (2.33%)	0 (0%)
Forgot	35 (37.63%)	13 (26.53%)	1 (3.33%)

<sup>1</sup>Subjects who did not report a reason for missed dose because they did not have missed doses, or because they skipped this question  
<sup>2</sup>Four subjects taking injectables who did not have missed doses went on to report a reason for missed dose

Table 2: Side effects and Medication Type

Reason	Type of Medication, n (%)		
	Orals	Injectables	Infused Med
Not side effects	27 (18.62%)	27 (20.15%)	26 (74.29%)
Redness, lumps, pain of skin	5 (3.45%)	37 (27.61%)	0 (0%)
Constipation	10 (6.90%)	5 (3.73%)	1 (2.86%)
Abdominal pain	9 (6.21%)	1 (0.75%)	1 (2.86%)
Diarrhea	11 (7.59%)	0 (0%)	2 (5.71%)
Other	9 (6.21%)	4 (2.99%)	1 (2.86%)
Flushing of face/arms	45 (31.03%)	3 (2.24%)	0 (0%)
Chills, flu like symptoms	2 (1.38%)	19 (14.18%)	1 (2.86%)
Nausea, upset stomach	8 (5.52%)	7 (5.22%)	1 (2.86%)
Double, blurry vision	6 (4.14%)	7 (5.22%)	0 (2.86%)
Heart racing	1 (0.69%)	4 (2.99%)	0 (0%)
Headache	9 (6.21%)	18 (13.43%)	2 (5.71%)
Vomiting	2 (1.38%)	2 (1.49%)	0 (0%)
Abnormal lab results	1 (0.69%)	0 (0%)	0 (0%)

## RESULTS

- We had 209 patients, 75.1% female and 24.9% male, mean age of 50.4 years.
- Eighty-nine patients (42.5%) were on oral medication, 90 (43%) on a SC/IM drug, and the remaining 30 (14.5%) on an IV infusion (Fig. 2).
- Fifty-five percent of patients on oral DMTs, 70.8% of patients taking SC/IM, and 93.3% on patients receiving IV infusions reported no missed doses (Fig. 3), respectively ( $p=0.005$ ).
- Ease of taking medication was reported by 77%, 60% and 33% of patients on oral, IV and SC/IM injections (Fig. 4), respectively ( $p<0.0001$ ).
- Reason for missed dose differed with respect to medication type ( $p=0.017$ ) with forgetfulness being reported in 37.6% and 26.5% of patients receiving oral and IM/SC DMTs respectively (Table 1).
- Side effects were significantly different for each medication type ( $p<0.0001$ ). Majority of those on IV did not experience side effects (74.3%), whereas only a minority of those taking orals (18.6%) and SC/IM (20.2%) responded as such (Table 2).

## CONCLUSIONS

In our population, lack of adherence was significantly higher in patients receiving oral as compared to injectable DMTs, despite their reported ease of administration. Side effect profile may have been a contributing factor to this outcome. Health care providers should implement strategies to improve DMT adherence, regardless of medication route.

### Acknowledgements

We would like to thank our colleague, Dr. Mary Anne Muriello, for referring her patients to our study.

### Disclosures

The investigators do not have any conflicts of interests to disclose