**Abstract**

**Background**

The Wahls Elimination (Wahls) and Swank dietary patterns are popular in the multiple sclerosis (MS) community but there is limited randomized clinical trial data on both.

**Objectives**

To assess and compare the impact of both diets on fatigue (primary endpoint) and other secondary endpoints within and between diet groups. Main hypothesis: Wahls diet group would experience a greater mean reduction in fatigue as measured by the Fatigue Severity Scale (FSS) than Swank diet group.

**Methods**

Parallel group, randomized, principal investigator (PI) and assessor-blinded. Measures included the FSS (primary endpoint), and secondary endpoints: Modified Fatigue Impact Scale (MFIS), MSQoL54 physical health and mental health subscales (QoL-PH; QoL-MH), Symbol Digit Modalities Test-Oral (SMDT-O), and 6 Minute Walk Test (6MWT[feet walked]) in adult relapsing-remitting MS patients with moderate fatigue (FSS ≥4). Study was 36 weeks with 4 in-person visits and 3 12-week periods. A 12-week observation period was followed by randomization (visit 2 [V2]), along with training on assigned diet and 5 telephone support calls by a registered dietitian. During the final period (visit 3 [V3] to visit 4 [V4]), there were no scheduled calls. Differences between V2 and V3, and V2 and V4 were analyzed using general linear mixed models to assess changes within and between groups over time using demographic and clinical control variables.

**Results**

There was no difference in baseline demographic or clinical characteristics between diet groups, with 77 participants completing V3 and 72 completing V4. Both groups had similar clinically significant improvements in FSS mean scores at V3 and V4 (Wahls, -0.7, -1.3; Swank, -0.9, -1.0; MFIS (Wahls, -14, -19; Swank, -10, -11), and QoL-PH (Wahls, 13, 13; Swank, 10, 13; all p<0.01). Improvements were observed for QoL-MH (Wahls, 11, 14, both p<0.01; Swank, 4, p=0.14, 6, p=0.03), SMDT-O (Wahls, 0.9, p=0.27, 2.3, p=0.01; Swank, 2.9, 2.6, both p <0.01), and 6MWT at V4 only (Wahls, 120, p<0.01; Swank, 33, p=0.13). Better outcomes were observed for the Wahls diet group: MFIS at V4 (-8.6, p=0.02), QoL-MH (V3, 7.5; V4, 8.1, p=0.05), and 6MWT at V4 (87.1, p=0.08).

**Conclusions**

Wahls and Swank diets groups showed clinically significant mean reductions in fatigue scores. The Wahls diet was associated with better outcomes for QoL-MH/MFIS, with suggested improvement on three other measures. Longer studies including brain imaging are warranted to establish effects for both diets on brain structure.