SUPPLEMENTAL METHODS & RESULTS

Socioeconomic Status

Socioeconomic Status (SES) is a multidimensional construct; we derived a composite index of SES that included individual indicators of educational attainment, literacy, and neighborhood deprivation. Methods below and subsequent results support the validity of this composite SES covariate, which provides a more thorough and conservative estimate of SES than any of the indicators in isolation. Educational attainment, literacy, and neighborhood deprivation (operationalized below) were normalized 0-100 and averaged into a composite SES measure.

Educational attainment is commonly utilized as a proxy of SES in adult populations, in part because information on education is readily available; however, educational attainment can be biased in younger adults who may not have completed their education. To account for this, we used educational attainment only for patients aged ≥25 years (consistent with the age cut-off used by the United States Census), but we additionally used parental educational attainment for all patients. Parental education is a proxy of early life SES and is a strong predictor of future educational and occupational success.[1] For patients and parents, education was reported as less than high school diploma [HSD], HSD, some college, Bachelor's degree, or graduate degree, which was re-coded to years of education: 10, 12, 14, 16, 18, respectively. Education was higher among patients than their parents (mean of mother and father), so educational attainment was derived as the mean rank across patient and parental education for each patient. For patients aged <25 years, only parental education rank was used. ***Literacy*** was estimated with a word-reading test (Wechsler Test of Adult Reading)[2], which is a better estimate of early life enrichment (e.g., exposure to print) and educational quality than years of education, especially in historically underrepresented populations.[3 22] This provides a quantitative assessment of exposure to print in educational and non-educational settings. ***Neighborhood deprivation*** was computed with the Agency for Healthcare Research and Quality (AHRQ) formula[4] for each patient's current five-digit zip code using US Census data on (a) median household income, (b) median property value, and (c) percent below poverty level, (d) percent with less than HSD, (e) percent with Bachelor's degree, and (f) percent crowded households (>1 person per room).

Correlations among SES Indicators. Correlations among educational attainment, literacy, and neighborhood deprivation ranged from 0.32 to 0.48, and principal components analysis yielded a single component explaining 58.3% of the variance across the three indicators. These data support the use of these three indicators to derive a composite SES metric.

Correlations between SES index, MEDAS, and MSFC. MEDAS was more related to our composite measure of SES (r=0.33 [95%CI: 0.25, 0.41] than it was to any individual indicator: educational attainment (r=0.21 [0.12, 0.29]), literacy (r=0.30 [0.22, 0.38]), neighborhood deprivation (r=0.24 [0.15, 0.32]). As shown by the 95% confidence intervals, MEDAS was significantly more related to the composite measure of SES than to either education or neighborhood deprivation alone. The SES index was also more related to the primary functional outcome MSFC (r=0.34 [0.27, 0.42]) than individual socioeconomic indicators (R's=0.20 to 0.33). These findings support the used of the composite measure of SES to statistically control for SES when considering associations between dietary patterns and disability outcomes.

Representativeness of Study Sample

In order to determine whether our sample was representative of all patients seen at our Center, we randomly selected five patient care days within a one-year period during the timeframe when data from the study sample were collected. Days were stratified by day of the week so that one of each weekday was selected (to ensure sampling of all providers). Patients aged 18-65 and diagnosed with MS were randomly selected from these days until a sample of 100 patients was identified. As with the study sample, the AHRQ estimate of neighborhood SES was derived from five-digit zip codes of permanent residences. The most recent BMI was recorded; three patients were missing BMI data. As with the study sample, patients who could not complete the T25FW due to disability were assigned the same value as the person with the slowest walking time; four other patients were missing T25FW data. As shown in Part A of the table, there was no differences in key demographic, wellness (BMI), or clinical disability (progressive disease, T25FW) variables between the study sample and the random practice sample. Part B on the right side of the table shows that, within the random

sample (n=100), there were no reliable differences in the same key variables between patients who did (n=42) versus did not (n=58) complete a neurobehavioral evaluation.

	A. Study Sample vs Random MS Practice Sample			B. Patients With vs Without Neurobehavioral Evals		
	Study (n=563)	**Random Practice (n=100)**	**P for Diff**	**With (n=42)**	**Without (n=58)**	**P for Diff**
Age in years, mean (sd)	44.2 (11.3)	45.8 (10.7)	0.189	47.7 (10.9)	44.3 (10.3)	0.117
Sex: women, n (%)	398 (70.7)	66 (66.0)	0.346	27 (64.3)	39 (67.2)	0.832
Race: White/non-Hispanic, n (%)	357 (63.4)	61 (61.0)	0.654	26 (61.9)	35 (60.3)	1.000
SES: AHRQ Index, mean (sd)	56.1 (2.8)	55.7 (2.6)	0.183	55.3 (2.3)	55.9 (2.7)	0.257
Disease Course: Progressive, n (%)	122 (21.7)	26 (26)	0.362	13 (31.0)	13 (22.4)	0.362
BMI: median (iqr)	25.7 (22.7, 30.4)	26.0 (22.4, 30.8)	0.792	26.4 (23.4, 32.0)	25.8 (21.7, 29.5)	0.173
T25FW: median (iqr)	4.5 (4.1, 5.4)	4.6 (4.2, 7.0)	0.100	4.6 (4.2, 6.3)	4.6 (4.2, 7.8)	0.885

MEDAS Scores in Healthy Controls

As noted within the main manuscript, MEDAS scores were comparable between our MS cohort and published data from healthy European adults. To be thorough, we also conducted an IRB exempt anonymous survey via REDCap to characterize MEDAS scores among healthy persons demographically similar to our MS cohort. Demographic data, height and weight (for calculating body mass index, BMI), and MEDAS scores were acquired from 224 persons aged 18-65 years who denied neurologic conditions. As shown in the table, MEDAS scores were comparable between MS patients and (a) the total healthy sample, and (b) a subsample stratified by age, sex, and race/ethnicity to demographically-match the MS cohort. As shown in the table, there were no differences in MEDAS scores between the MS cohort and either the total healthy sample or the demographically-matched subsample. These additional data further demonstrate that Mediterranean diet adherence in our MS cohort did not differ from healthy persons.

	MS n=563	**Healthy: Total n=224**		**Healthy: Matched n=140**	
	Data	***Data***	***P vs MS***	***Data***	***P vs MS***
Age, mean (SD), y	44.2 (11.3)	41.3 (12.1)	0.001	44.1 (10.9)	0.900
Sex, n (%)	W: 398 (70.7) M: 165 (29.3)	W: 157 (70.1) M: 67 (29.9)	0.863	W: 98 (70.0) M: 42 (30.0)	0.918
White, non-Hispanic, n (%)	357 (63.4)	174 (77.7)	<0.001	91 (65.0)	0.769
BMI, mean (SD)	27.1 (5.9)	26.2 (5.9)	0.050	26.6 (6.0)	0.396
MEDAS, mean (SD)	6.25 (2.35)	6.23 (1.99)	0.922	6.29 (2.01)	0.825

References

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