

Understanding MS Fatigue: Initial Subtype Discovery from the MS Mosaic Project

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Objective: To improve our understanding of fatigue among people with MS through a novel mobile-based platform and machine learning methods.

Background: Up to 97% of MS patients will experience significant fatigue during their clinical course. Several assessment tools attempt to characterize fatigue, but they have significant limitations and are too infrequently administered to represent this highly dynamic symptom. As a result, intervention studies poorly assess response, and MS patients undergo frequently ineffective empiric treatment trials. Progress in our understanding and management of MS fatigue will require more frequent symptom reporting, nearly continuous data collection on effect modifiers, and effective analytic tools capable of interpreting multiple data types.

Design/Methods: MS Mosaic is a longitudinal study that combines data from a mobile platform with existing biomarkers and then utilizes machine learning methods to help reveal a more comprehensive picture of MS. For fatigue characterization, data from participants' daily symptom surveys, medication diaries, weekly study tasks (timed walk, PASAT, finger tapping), and mobile sensors (sleep, steps) since study launch are analyzed using clustering methods.

Results: Fatigue subtypes are successfully discovered using MS Mosaic app data, and machine learning clustering methodology for analysis.

Conclusions: Clustering analysis from the MS Mosaic Study provides readily identifiable subtypes (with the use of monitoring platforms like MS Mosaic) and will prove useful in the design of upcoming fatigue intervention studies.

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