

# Travel behaviour in persons with Multiple Sclerosis using travel diaries and GPS tracking technologies

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## ABSTRACT

**Background:** Persons with Multiple Sclerosis (MS) experience several physical and cognitive problems which can influence their travel behaviour. Few data are available about the real participation (restrictions) in daily outdoor activity and travel behaviour.

**Objective:** This pilot study aimed to document, in relation to disease-related disability, which, and how many, activities and trips were daily made by persons with MS, and what transport modes were used.

**Methods:** 36 persons with MS (Expanded Disability Status Scale, EDSS, 1.5-8.0, age 27-63) and 24 healthy controls (age 25-62) were studied, using activity-related travel diaries and GPS tracking devices. Information about overall disability characteristics and function was gained by standard clinical tests and questionnaires. MS patients were further divided in subgroups based on EDSS cut-off scores 4.5 and 6.5.

**Results:** Persons with mild ambulatory dysfunction (EDSS 1.5-4.0, n=17) showed similar travel characteristics as healthy controls (regarding number of trips, travel mode and company) with few restrictions during travelling, although self-limiting modifications in driving behaviour were observed. Statistically significant adaptations in activity and travel behaviour were detected in the moderate (EDSS 4.5-6.5, n=8) and severe MS subgroups (EDSS >6.5-8.0, n=11): driving independently became more difficult, significant more trips were made with company and the duration of performed activities

had increased. In the severe MS subgroup, the living environment seemed to have a large influence on the making of (independent) trips.

**Conclusions:** The combination of self-reported travel diaries and objective GPS loggers offered detailed information about the actual outdoor travel behaviour of persons with MS, which was significantly changed in MS patients with EDSS greater than 4. Future studies in larger samples will assess the specific and relative impact of disease-related psychological, visual, cognitive and physical factors on the activity and travel behaviour in patient profiles with various disability severity.