

Abstract 513  
Prediction of MS disability status in Japanese claims database using principal component analysis  
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**Background**  
Claims databases are widely used in MS research to evaluate clinical practice and outcome of MS treatments in real-world settings. However, disability status as indicated by Expanded Disability Status Scale (EDSS) is not available in claim databases, which makes it difficult to evaluate current healthcare situation of MS patients with higher disability status like SPMS.

**Objectives**  
To describe healthcare situation in Japanese MS patients with higher disability status like SPMS using a score representing disability status developed by principal component analysis from claims database

**Methods**  
We employed principal component analysis, which is a multivariate data analysis technique, for developing a score to predict the severity of MS using the information extracted from claims data. The Medical Data Vision database (a nationwide hospital-based claims database covering all diseases) was used as a data source (2009-2018, n=7067). Diagnosis and medication codes related to 7 functional systems of EDSS were selected based on the MS treatment guideline and advice of the medical expert. Additional claims (e.g. locomotion rehabilitation fees) which are supposed to be associated with higher disability status were also included. A score for each patient in each year was calculated based on the eigenvector coefficient for each factor of the first principal component, and then divided into 4 groups by quartile values of this score. Treatment pattern, healthcare resource utilization and costs in these 4 groups were described.

**Results**  
The average ages were 43.3 and 55.4 years in the lowest and highest score groups, respectively. The duration since first diagnosis was 6 years for the lowest group and 8.1 years for the highest group. The total healthcare costs (JPY 102,053 vs 157,387 pppm), frequency of visit (0.69 vs 1.29 pppm) and hospitalization (0.004 vs 0.066 pppm) were numerically higher in the highest group compared with the lowest group. Meanwhile, frequency of relapse was numerically higher in the highest-score group (1.1 vs 4.1% pppm), which was counterintuitive considering natural course of MS.

**Conclusions**  
A novel method using claims database was developed to represent MS disability status of an individual patient. This method enabled to describe the current healthcare situation of Japanese MS patients with higher disability status and demonstrated increased healthcare cost and resource utilization in this population.

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