Revisiting Spasticity After Stroke: Clustering Clinical Characteristics for Identifying At-Risk Individuals

ABSTRACT

Purpose: To collectively identify the clinical characteristics determining the risk of developing spasticity after stroke. Patients and Methods: A cross-sectional study was conducted at a single rehabilitation outpatient clinic from June to December 2019. Inclusion criteria were stroke duration of over four weeks, aged 18 years and above. Exclusion criteria were presence of concurrent conditions other than stroke that could also lead to spasticity. Recruited patients were divided into "Spasticity" and "No spasticity" groups. Univariate analysis was deployed to identify significant predictive spasticity factors between the two groups followed by a two-step clustering approach for determining group of characteristics that collectively contributes to the risk of developing spasticity in the "Spasticity" group. Results: A total of 216 post-stroke participants were recruited. The duration after stroke ($p < 0.001$) and the absence of hemisensory loss ($p = 0.042$) were two significant factors in the "Spasticity" group revealed by the univariate analysis. From a total of 98 participants with spasticity, the largest cluster of individuals (40 patients, 40.8%) was those within less than 20 months after stroke with moderate stroke and absence of hemisensory loss, while the smallest cluster was those within less than 20 months after severe stroke and absence of hemisensory loss (21 patients, 21.4%). Conclusion: Analyzing collectively the significant factors of developing spasticity may have the potential to be more clinically relevant in a heterogeneous post-stroke population that may assist in the spasticity management and treatment.