

**Cordella C, Munsell M, Godlove J, Anantha V, Advani M, Kiran S (2022)**  
**Dosage Frequency Effects on Treatment Outcomes Following Self-managed Digital Therapy: Retrospective Cohort Study, *J Med Internet Res* ;24(7):e36135 doi: [10.2196/36135](https://doi.org/10.2196/36135)**

**Background:** Although the efficacy of high-dose speech-language therapy (SLT) for individuals with poststroke aphasia has been established in the literature, there is a gap in translating these research findings to clinical practice. Therefore, patients continue to receive suboptimal amounts of SLT, with negative consequences for their functional communication recovery. Recent research has identified self-managed digital health technology as one way to close the dosage gap by enabling high-intensity therapy unrestricted by clinician availability or other practical constraints. However, there is limited empirical evidence available to rehabilitation professionals to guide dose prescriptions for self-managed SLT despite their increasing use in the COVID-19 era and likely beyond.

**Objective:** This study aims to leverage real-world mobile health data to investigate the effects of varied dosage frequency on performance outcomes for individuals with poststroke speech, language, and cognitive deficits following a 10-week period of self-managed treatment via a commercially available digital health platform.

**Methods:** Anonymized data from 2249 poststroke survivors who used the Constant Therapy app between late 2016 and 2019 were analyzed. The data included therapy tasks spanning 13 different language and cognitive skill domains. For each patient, the weekly therapy dosage was calculated based on the median number of days per week of app use over the 10-week therapy period, binned into groups of 1, 2, 3, 4, or  $\geq 5$  days per week. Linear mixed-effects models were run to examine change in performance over time as a function of dosage group, with post hoc comparisons of slopes to evaluate the performance gain associated with each additional day of practice.

**Results:** Across all skill domains, linear mixed-effects model results showed that performance improvement was significantly greater for patients who practiced 2 ( $\beta=.001$ ;  $t_{15,355}=2.37$ ;  $P=.02$ ), 3 ( $\beta=.003$ ;  $t_{9738}=5.21$ ;  $P<.001$ ), 4 ( $\beta=.005$ ;  $t_{9289}=7.82$ ;  $P<.001$ ), or  $\geq 5$  ( $\beta=.005$ ;  $t_{6343}=8.14$ ;  $P<.001$ ) days per week compared with those who only practiced for 1 day per week. Post hoc comparisons confirmed an incremental dosage effect accumulating with each day of practice (ie, 1 day vs 2 days, 2 days vs 3 days, and 3 days vs 4 days), apart from 4 days versus  $\geq 5$  days of practice per week. The result of greater improvement for higher versus lower dosage frequency groups was true not only across all domains but also within a majority of individual subdomains.

**Conclusions:** The findings from this study demonstrated that increased dosage frequency is associated with greater therapy gains over a 10-week treatment period of self-managed digital therapy. The use of real-world data maximizes the ecological validity of study results and makes the findings more generalizable to clinical settings. This study represents an important step toward the development of optimal dose recommendations for self-managed SLT.