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Submitting author: Mr Ka Leung CHAN

Post title: Occupational Therapist I, Kowloon Hospital, KCC

Predicting the 1 year ADL independence level of ambulatory clients with stroke receiving occupational therapy by data mining

*Chan MKL, Cheung TY, Cheung P, Ng CW, Chan DYL, Ng SSW
Occupational Therapy Department, Kowloon Hospital*

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Introduction

Cerebrovascular disease was the fourth leading cause of death in Hong Kong in 2013. The age-standardized death rate due to cerebrovascular diseases has dropped by more than half over the past two decades from around 60 to below 30 per 100,000 standard populations. Since stroke did not only affect physical function of the clients whereas the cognitive function and self-care abilities were impaired, seamless ambulatory treatment after discharge from hospital is indicated for those stroke survivors. As the demand for continuous rehabilitation is increasing, effective triage mechanism and evidence driven protocol is warranted. As a result, we can reorganize the rehabilitation processes according to the characteristics of the clients and facilitate the clinician to make judgment during treatment processes.

Objectives

To explore the characteristics of the clients with stroke receiving ambulatory occupational therapy service and finding the factors that can predict the one year outcome of the clients.

Methodology

The data profile of the ambulatory patients who received occupational therapy service in Kowloon Hospital from 2014 is retrieved. The profile contain gender, age, type of stroke, cognitive function (MMSE), physical function (hand-FTHUE, balance), Activities of daily living performance (FIM) and Instrumental of daily living (Lawton IADL Scale). Those assessment data include initial intake, 2 months follow up, 4 months follow up, 6 months follow up, 8 months follow up and 1 year follow up. Clustering (DBSCAN) was done to see any homogenous group was present in the initial profile of the subjects. Decision tree algorithm was adopted to classify the 1 year outcome.

Result

55 patients records were retrieved after checking of consistency and removal of outlier.

There were 4 groups of subjects found after clustering done. The group with hemorrhage diagnosis and female would show comparably lower self care abilities and balance performance. Moreover, the self care independence of the clients after 1 year treatment could be predicted by the ADL (F-measure=1) and balance performance (F-measure=0.982) in the 6 months review. Furthermore, both the 1 year outcome in hand function and performance in instrumental activities of daily living could be predicted by the performance in 8 months follow up. With the above results, we could plan the treatment goals and focuses with the clients according to their progress.