Telerehabilitation programme based on serious games and lifestyle monitoring

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With an estimated 16.9 million cases of stroke incident per year, there is an increased need for healthcare providers to adopt new patient rehabilitation models able to cope with this high number of patients in a sustainable way. The REWIRE project proposes a new telerehabilitation programme to improve balance and stability capabilities. Once patients achieve the adequate and safe level of balance capability, they are discharged from hospital care to continue their rehabilitation at home with REWIRE system. This is achieved with the following components: (i) A patient station (PS), deployed at patient home that includes a set of “serious games” based on virtual reality environment. These serious games were especially designed to provide full rehabilitation programme of exercise for posture and balance. (ii) A hospital station that is a web based tool that allows clinician to control patient rehabilitation and analyse data from patient lifestyle sensors. Clinicians are able to see patient progress and design specialised therapy and exercises based on serious games. (iii) A networking station that provides advanced capabilities for analysing the full population of patients.

As part of this project, we performed an evaluation of the acceptance of the system according to the Technology Acceptance Model (TAM). The TAM questionnaire included 24 questions with 7-point Likert scale ranging from “strongly disagree” (scored as 1) to “strongly agree” (scored as 7). TAM can be divided in the following dimensions: perceived ease of use (PEU), perceived usefulness (PU), subjective norm (SN) and intention to use (IU). Patients received 2-week training at hospital with guidance and supervision of trained clinicians. In order to participate in this project, the following inclusion criteria were defined: patients with age over 18 years old, male and female, history of stroke ≥ 3 months, consented informed signed, presence of caregivers, Minimental State Examination score > 20, Functional Ambulation Classification ≥ 3, ability to walk for six minutes, Berg Balance Scale > 21, enough space and WiFi at home for the use of REWIRE system.

Eight patients completed the 2-week training with the system. These patients had an average age of 49.8 ± 15.5 and 50% of patient were women. The obtained results according to the TAM questionnaire is: 6.3 ± 0.35 in PEU, 6.2 ± 0.41 in PU, 6.5 ± 0.20 in SN and 5.8 ± 0.64 in IU. This information will be complemented with the evaluation patient and healthcare professional acceptance and health outcome impact after 3 months of rehabilitation at home with the REWIRE system.

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