Virtual Coaching Activities for Rehabilitation in Elderly

Call: H2020-SC1-2016-2017

Grant Agreement Number:769807

D1.4 Natural representation for clinical pathways

Extended summary

ThevCareproject has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769807.

This document provides an overview of the dynamic clinical processes that form the foundation of virtual coaching system. The coaching suggestions will be continuously adapted through the analysis on runtime of information provided by different sources such as the patients' vital stats, ambient activity sensors, facial recognition, voice analysis, environmental contextual factors etc. These transform the virtual coach in an innovative engaging personal companion of the patient that will support patient rehabilitation treatment adherence in a home setting with a limited but still adequate involvement and support from reference medical personnel.

The overall scope of this document was extended in order to provide a comprehensive, consistent, final baseline of all end-user, clinical, and other stakeholders' requirements, establishing a unified and clear definition of the clinical scope of the project. In this sense the deliverable acts as a conceptual brace for all clinical concepts. Previous deliverables (D1.1, D1.2 and D1.3) have thus provided the necessary inputs for D1.4. This deliverable (core deliverable) can be considered as the clinical baseline for the further technical requirements and all other developments that will follow.

In the document, the four reference sites give insights in their pathways focusing on the home rehabilitation by transferring and expanding the current experiences to the home field.

BACKGROUND

The current deliverable (D1.4), aims to describe the key elements needed for the intelligent adaptation of the care pathways assigned to the patient. It provides the technical partners with an overview of **what** (in terms of the rehabilitation programme) **should be personalized** from a clinical perspective. The description of the clinical pathways which are represented here, embedding the relevant ontology classes and the rules presented in D1.3, is a compulsory preliminary condition for the conceptualization and formalization of pathway templates to be performed in WP6.

CLINICAL PATHWAYS

Each clinical reference site has followed a similar pattern to describe the clinical pathways adapted for their specific pathology. The analysis is structured into 5 steps:

- Patient profile characterization: Identification of the different clinical factors that should be addressed by the different pathways;
- Clinical needs to be addressed: Identification of the needs emerging from the relevant evaluated clinical aspects of the Patient Profile;
- vCare home coaching activities: representation of the coaching activities to be provided by vCare within a specific pathway (including the adaptation of the impacted elements of the ontology);
- Narratives description in the home clinical pathway schema: mapping of the D1.2 narratives/use cases in the defined pathway schema (See example in figure 1);

- Innovation potential in the clinical pathway at home: clinical representation of the rehabilitation setting with and without vCare.

An example of a Clinical Pathway Schema is shown in Figure 1 below. In red the mapping of the first Use Case (Stroke, as defined in D1.2) in the pathway schema.

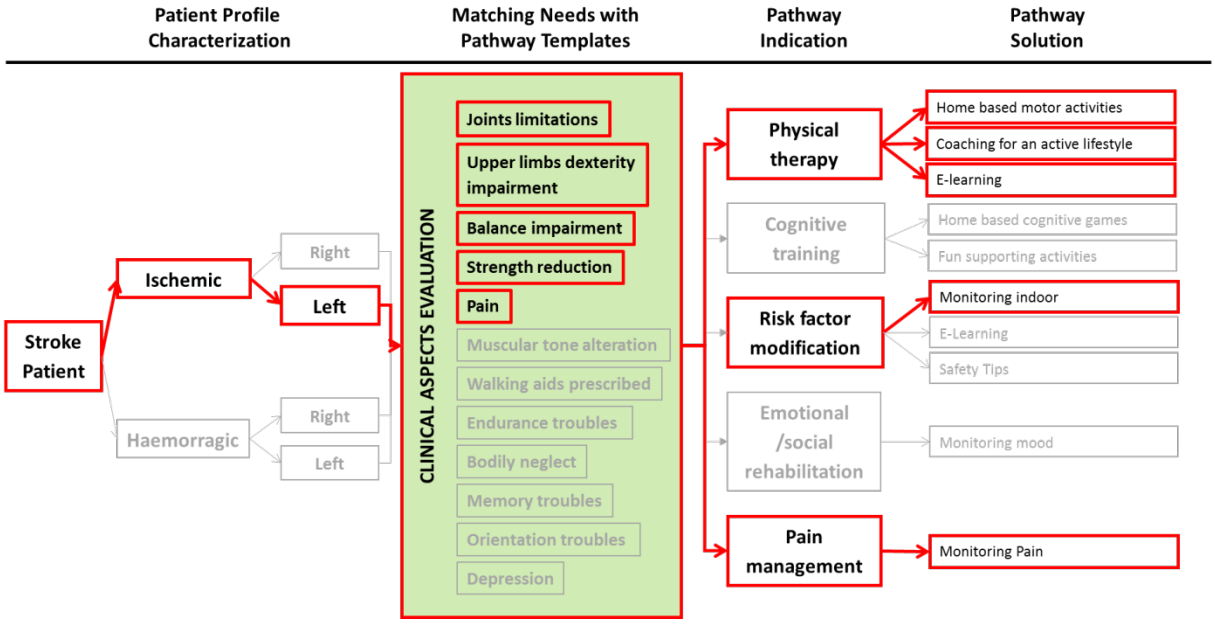

Figure 1: example of a Clinical Pathway Schema (Stroke - First Narrative: Mrs. Maria – Use cases #1)

The depicted adaptation of the pathway was designed in order to give to the system the capability to:

- Allow incremental intensity level adaptation of games or exercises in accordance with the patients' clinically assessed needs, preferences and progress during the home rehabilitation.
- Suggest behaviours according to the current situation encountered by the patient in his daily life, providing appropriate feedback or reminders as a mean to ensure the compliance/adherence to the set pathway.

When describing possible adaptations of the pathway, we specified also the impacted elements of the ontology referenced in D1.3: Evidence Indicators, Time Events, Feedback, Exceptional procedures.

TRACEABILITY AMONG WPS

This document is also instrumental to identify all the elements which need to be traced in order to feed the interaction between clinical needs and functional requirements. For each activity (reported in the Pathway Solution) we defined a specific table which provides the traceability among WPs.

Tables "Activity cross reference with the Services (WP5) and with the Functional Requirements (WP7)" consist of following columns:

- **Activity**: list of all the digital activities foreseen by the project,
- **Pathology**: pathology, as defined in D1.1, whose rehabilitation plan is enhanced by the mentioned activities;
- (Medical) **Use Case:** use case, as defined in D1.2, which justifies the choice of the activity;
- (Clinical) **Needs:** clinical needs emerging from use case description. The mapping between Uses Cases and Needs is presented in the conclusions of D1.2;
- **Services**: identification of the services, defined in D5.1
- **Requirements**: identification of the requirements addressing a specific clinical need, as defined in D7.4.

An example of "Activity cross reference" table is shown below. Each activity has been described in a similar way.

Clinical Needs (Summary WP1)					**Service Needs (WP5)**		**Functional Requirements (WP7)**
Activity (A)	**A #**	**Pathology**	**Medical Use Case UC #**	**Clinical Needs**	**Services (S)** (see D5.1)	**S #**	**Requirement Reference #** (see D7.4)
Home-based motor activities	A-1	SD	UC1	Physical therapy	Physical Training	CS-1	R5-8
					Health status	CS-2	R5-5
					Rehabilitation coach	CS-5	R3-6, R4,6
					Intelligent notifications scheduler	CS-6	R2-7, R2-8, R3-1, R3-6, R5-3, R5-4
					User Feeling	CS-8	R5-6
					Body position detection	DS-2	R2-3
					Agenda	SS-2	R3-1, R3-7

Table: example of Activity cross reference with the Services (WP5) and with the Functional Requirements (WP7).