

EXPERIMENTATION OF 'LINK FOR HEALTH', A NEW TELEHEALTH APPLICATION IN COCHIN HOSPITAL, FRANCE

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Abstract

Orange and Cochin Hospital have experimented with 'Link for Health', a new Telehealth application in the Department of Oncology of Cochin Hospital, France. This new application allows a complete Telehealth service combining mobile application, sensors and questionnaires to return to healthcare team by Internet. The purpose of this paper is to analyse and the effectiveness of the Telehealth service trial, in oral and intravenous anti-cancer therapy to improve clinical and process outcomes. Results were analysed in terms of benefits for the patients and the hospital team.

Keywords: Telehealth; mHealth; medication; anti-cancer therapy; treatment toxicity

Introduction

Orange and Cochin Hospital have trialled 'Link for Health', a new Telehealth application in the Department of Oncology of Cochin Hospital, France. This new application allows a complete Telehealth service combining mobile application, sensors and questionnaires to return by Internet to healthcare team. The purpose of this paper is to analyse the effectiveness of the Telehealth service, in oral and intravenous anti-cancer therapy to improve clinical and process outcomes. Results were analysed in terms of benefits for the patients and the hospital team.

The Telehealth service

The telehealth service 'Link for Health' combines various hardware equipment and mobile applications such as:

- A mobile application including recall functions (medication reminder, doctor's instructions, complementary examination, appointment ...), a function of drug intake acknowledgment, and

a function to retrieve expected information (tension, undesirable effects ...)

- An e-prescription tool allowing the patient to save prescriptions autonomously in his smartphone (in 2D barcode, printed or by mail) without retranscription and therefore without error.
- A web interface for healthcare professionals: to dematerialise medical prescriptions, to see the patient's feedback synthesis at any time or to see the details of a particular feedback (blood pressure or weight).
- The service may also collect data from connected sensors (loaned by the hospital or owned by patient). In this trial, we used the Withings connected scale and a manual Tensiometer.

Functioning of 'Link for Health' Telehealth service

The mobile application is installed on the smartphone from Playstore, during an appointment at the hospital. At start-up, initial information is requested for the therapeutic process, such as:

- a 4-character patient identifier (provided and secured by the hospital team)
- personalisation of patient's usual schedules (morning, noon, evening, rising and bedtime)
- connected objects declaration (installation according to the procedure)
- the "Link for Health" mobile application which incorporates a medication reminder App developed previously under the name 'PillTag'.¹ Today, the App adds new features such as the consideration of expanded prescriptions and three means of feedback for the patient (drug intake acknowledgment, filling of customised forms and collection of data from connected sensors)

Questionnaires are pages to be completed on the smartphone. They concern, on the one hand, the general state of health of the patient and, on the other hand, the side effects of prescribed medications.

Questionnaires use the Common Terminology Criteria for Adverse Events (NCI-CTCAE).²

The general state of health of the patient questionnaire includes (i) weight measurement and monitoring through the information returned by the connected scale (twice a week) and (ii) blood pressure measurement performed by the patient using a manual tensiometer. Data on the smartphone are automatically returned to healthcare team via the Internet.

The questionnaire describing the tolerance to treatment and side effects is completed by the patient based on the observed effects and symptoms are graded from 0 to 3 using a drop-down menu. Symptoms include the following conditions and items: pain, fatigue, neuropathy, fever, loss of appetite, mucositis (aphthae), nausea, vomiting, diarrhoea, constipation, hand-foot syndrome (redness, oedema, tingling...), decreased activity, cracks, blisters, burns, etc.

Therapeutic context and expectations

Cancer treatments can improve patients' survival and quality of life but are associated with severe toxicity. The safety profile depends not only on the type of primary cancer, drug regimen and dosing, but also on the patient's age, comorbidities, concomitant medications and general health status, and varies for each patient. Therefore, Telehealthcare involving personalised healthcare over distance may improve care for cancer outpatients.

The purpose of this paper is to analyse and trial the effectiveness of the Telehealth service, in oral and intravenous cancer therapy to improve clinical and process outcomes.

The medical team's expectations were to (i) check to what extent such a service allows follow-up of patients at home, (ii) rethink organisation to avoid spending time on the telephone and organising visits at hospital, (iii) reinforce both the safety of patients at home and the ergonomics of the hospital management interface (diary management, events calendar, patient recall...).

The patient needs and expectations were the following: (i) a better follow-up between two visits to the hospital, (ii) to stay in touch with the hospital, (iii) to obtain reassurance, (iv) the storage and use of the information sent to hospital and (v) a medical process that effectively accompanies the patient out of the hospital.

Study

The study involved patients on oral and intravenous anti-cancer treatments in the oncology department of Cochin Hospital in Paris (France) for six months. Results were analysed in terms of the degree of medical team satisfaction, patient satisfaction, service ergonomics and benefits for the therapy process.

Results and Lessons

This first version of 'Link for Health' Telehealth service was essentially built on the current needs and expectations of the healthcare team, logically related to the most urgent and important patient medical care needs. Therefore, this first version partially met patient's expectations, but analysis of the patient's feedback showed unexpected and very informative elements for the future.

Analysis of the patients' feedback

We observed an extremely positive adoption by patients. They were generally interested and reassured by monitoring and some were also motivated to help the hospital and research. The context of presentation of the service appeared to be decisive for the patient's support. Indeed, and contrary to expectations, it seems to be not ideal to present the service on the first day of appointment since it is a moment of exchange already full of information and emotions. Therefore, more than 90% of patients accepted to have the service presented another day.

In return for their efforts, patients expect a rapid or even instantaneous return, which requires a change in process.

Impact on the medical process

Health professionals observed first that the service presentation required a not negligible time of explanation. But further, this time has been considered as a necessary time of medical questioning to collect information about the patient's rhythm of life and such initial investment appeared to save time thereafter.

The service allows patients to report adverse reactions (graded from 0 to 3) and the Oncology department of Cochin hospital has a follow-up unit (ATHOS team) that patients should contact when the grade is greater than or equal to 2. Then, since the feedback of the service are analysed offline and to avoid any ambiguity, the application was modified to advise the patient to call this unit from grade 2.

First, experiment was carried out with the usual

hospital organisation, i.e. oncologists took note of data returned by the patient at the appointment time or a few days before. However, since it appeared that patients need some interactivity, organisation and time management needs to be rethought. For instance, to free up occasional time to spend with a patient, time can be saved by not calling patients who are well, decreasing the number of calls, reducing nurses' office time, and reducing time spent on phone calls or scheduling upcoming appointments.

Economics

In France, Telehealth services are in a development phase and their business model is still under investigation. Today, connected sensors for healthcare

are not yet validated and codified and remain under study because their funding could potentially be in part by the patient, and his mutual and the Health Insurance. However, we can nevertheless draw a potential value chain of ‘Link for Health’ Telehealth service such as in Figure 1. A reasonable hypothesis for the future financing of the service could be the following: the connectivity equipment and the connected scale would remain under the responsibility of the patient, while the service “Link for Health” could be financed by the hospital, which would re-invoice Health Insurance.

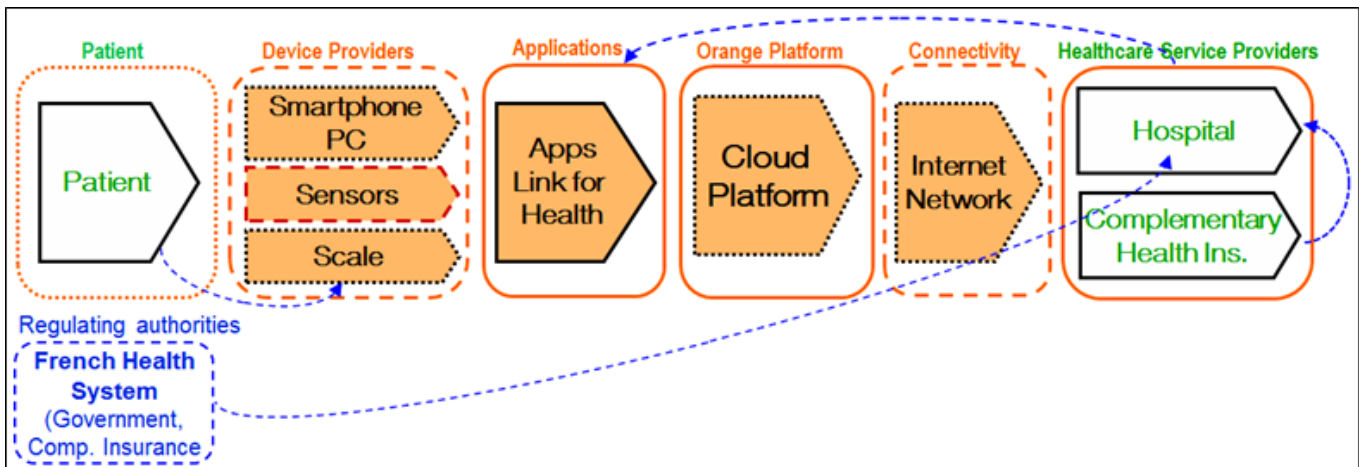


Figure 1. Value Chain of ‘Link for Health’ Telehealth service.

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Conflict of interest. The authors declare no conflicts of interest.

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