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Internet-based technologies to improve cancer care coordination: Current use and attitudes among cancer patients

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Abstract ***Background:*** The uses of internet-based technologies (e.g. patient portals, websites and applications) by cancer patients could be strong drive for change in cancer care coordination practices. The goal of this study was to assess the current utilisation of internet-based technologies (IBT) among cancer patients, and their willingness to use them for their health, as well as analyse the influence of socio-demographics on both aspects.
Methods: A questionnaire-based survey was conducted in June 2013, over seven non-consecutive days within seven outpatient departments of Gustave Roussy, a comprehensive cancer centre (≈160,000 consultations yearly), located just outside Paris. We computed descriptive statistics and performed correlation analysis to investigate patients' usage and attitudes in correspondence with age, gender, socioeconomic status, social isolation, and place of living. We then conducted multinomial logistic regressions using R.
Results: The participation level was 85% ($n = 1371$). The median age was 53.4. 71% used a mobile phone everyday and 93% had access to Internet from home. Age and socioeconomic status were negatively associated with the use of IBT ($p < 0.001$). Regarding patients' expected

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benefits, a wide majority valued its use in health care, and especially, the possibility to enhance communication with providers. 84% of patients reported feeling comfortable with the use of such technologies but age and socioeconomic status had a significant influence.
Conclusion: Most patients used IBTs every day. Overall, patients advocated for an extended use of IBT in oncology. Differences in perceived ease of use corresponding to age and socioeconomic status have to be addressed.

1. Introduction

Today, a number of important changes are altering cancer care delivery. We observe an increase in outpatient care services coupled with a decrease in inpatient care. Clinical advances have improved the survival rates for most cancers, leading health professionals to treat cancer as a chronic disease. With oral therapies, more cancer patients, even during active treatment, can also be cared for from home. These changes, which could save important costs in a context of high financial constraints, are, however, challenging current cancer care coordination practices [1,2]. Better coordination between patients and providers and among providers, is utterly needed to ensure adequate follow-up of patients. Internet-based technologies (IBT) such as patient portals, websites and applications, managed by healthcare institutions, have therefore been recognised as a significant lever to improve cancer care coordination practices [3].

A recent systematic review conducted in the US, in 2013, highlighted the four recurrent components of cancer coordination: (1) roles and models for communication and transfer of care between primary care physicians and oncologists during active treatment and survivorship; (2) care navigation through designated personnel or telecommunication processes among care team members; (3) treatment summaries and survivorship care plans; and (4) multidisciplinary communication accompanying patient and practice management within the framework of the Chronic Care Model [4,5].

In light of this, IBT can bring valuable opportunities to improve cancer care coordination by enhancing patient-provider communication, by monitoring adverse events and by providing better patient follow-up at distance [6,7].

However, more evidence is needed regarding cancer patient's current use and willingness to use IBT to monitor their health. First, it is important to know more about their physical connectivity to Internet. In the general population, although physical connectivity to Internet remains a concern, the 'digital divide' is narrowing. For instance, in the EU28, 79% of households had access to the internet in 2013 and 76% had a broadband internet connection, compared with 55% and 42%, respectively in 2007 [8]. Nevertheless, cancer patients can have specific characteristics compared to the general population, especially as cancer patients tend to be older [9]. Secondly, it is required to understand the attitudes regarding computers, internet and applications as they may play an important role in the willingness to use them for their health [10,11]. Thirdly, the question of the influence of social inequalities has to be addressed. In the literature, the most frequent sociodemographic factors found to be predictors of IBT use were age, education, socioeconomic status, gender, place of living and social isolation [12–17].

1.1. Scope of the study

Based on a patient survey, the three objectives of the study were:

- To understand the current level of use of IBT (computers, tablets, mobile phones and smartphones).
- To assess the intention to use IBT for their health.
- To determine what socio-demographic criteria could be predictors of the use and willingness to use new IBT in healthcare.

2. Patients and methods

A questionnaire-based survey was conducted in June 2013 in Gustave Roussy within seven outpatient departments (medical oncology for prostate, breast, skin, head and neck, endocrine, gastric and cervical cancers, radiotherapy, radiology, anaesthesia, haematology).

2.1. Setting

2.1.1. Gustave Roussy

Gustave Roussy is the largest comprehensive cancer centre in Europe, and is located in the suburbs of Paris. The hospital cares for about 50,000 cancer patients annually. Patients come from the full range of socioeconomic backgrounds.

2.1.2. Project scope

This study was conducted in response to the needs of the CAPRI (Cancer, Parcours de Soins, Région Ile de France) project that is in the process of being implemented at Gustave Roussy (2013–2016). Its objective is to improve the quality of care and coordination for cancer patients treated in the hospital through the