Online Patients in an Offline Health Care Sector: Are Hospitals Ready for Electronic Communication With Patients?

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***Abstract*—Surgery cancellations are undesirable in hospital settings. In order to reduce elective surgery cancellations at the University Hospital of North Norway, the eTeam-Surgery project studied the pre-operative planning to determine if part of the planning process could be moved from the hospital to the patient at home – through electronic collaboration. This paper discusses the actual readiness for electronic communication between patients and hospitals. In order to approach the readiness for electronic communication, the method section is divided in two parts. The first part consists of a documentary study of the most recent health reform in Norway, focusing on the readiness for using IT within the health care sector. In the second part, an in-depth empirical study of the pre-operative planning process at the hospital, is described. The results are reported in three analytical categories, according to the findings: a) Norwegian health policy; b) Health care workers at the hospital; c) The hospital as an entity. The authors' conclusion is that while Norwegian health policy strongly promotes electronic collaboration, and health care workers are ready to use new tools, the hospital, as an entity, is not yet ready for electronic communication between patients and the hospital.**

Keywords-elective surgery cancellations; pre-operative planning; e-readiness; electronic communication; health policy; hospitals; health care workers; Norway health care.

I. INTRODUCTION

In most hospitals, surgical departments are simultaneously the major area of investment, and the greatest source of revenue [1],[2]. Nonetheless, elective surgeries are regularly cancelled; cancellation rates between 10 and 40 % have been reported [2]-[5]. In western countries, up to 20 % of elective surgeries are cancelled on the day of surgery. However, it is also identified that 50 % of these cancellations might be avoided [2],[6],[7]. The reasons for elective surgery cancellation vary, but evidence points to lack of information as being a main cause. These studies refer to information that existed prior to the day of surgery, but was not available when required [8],[9]. The patient often holds such information.

The Norwegian population is well prepared and able to use Information and Communication Technology (ICT): Patients, including elderly or less-educated [10],[11], are using electronic health care services [12]. There is also an increasing tendency for health care workers to use their personal electronic devices to support their clinical work [13],[14]. Such trends in the health care sector, often designated as e-readiness, open new possibilities to approach the elective surgery cancellation problem. With e-readiness, we refer to the preparedness for using Information and Communications Technology in health care.

In line with the aforementioned literature on elective surgery cancellation, in 2008, the University Hospital of North Norway (UNN) did identify inadequate planning due to lack of information as a main cause for cancellations [15]. The aim of the research project, "eTeam-Surgery", is to reduce the number of elective surgery cancellations at UNN, by providing the lacking information from the patient to the hospital at an earlier stage in the pre-operative planning process. The eTeam-Surgery project has studied the pre-operative planning at UNN to determine if, and how part of the process can be moved from the hospital to the patient at home, through electronic collaboration.

To develop a tool for electronic collaboration between the patient and the hospital is not an easy, nor a straightforward task. A substantial amount of the literature in the field of health ICT, reports on unsuccessful implementation projects, challenges and unforeseen consequences of ICT in health care, particularly in hospitals [16]-[28]. In order to evaluate the possibility of using electronic (i.e., web-based)

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communication between the hospital and the patient prior to surgery, this paper focus on what appears to be a paradox in the Norwegian health care sector. Despite the reported e-readiness of the population (patients and health care workers), several health ICT projects have failed to fulfil their expected outcomes, also in Norway [29]-[31]. While literature demonstrates patient's readiness for using web-based tools, knowledge on the political and organizational readiness for such communication are scarce. It is our argument that these are important actors in the success of health IT. This paper addresses the political and organization readiness for health IT and ask; is the Norwegian health care sector ready for electronic communication during pre-operative planning?

In order to gain knowledge on the Norwegian governmental vision on health ICT, a documentary study of the most recent reform in the Norwegian health care sector was conducted. The reform is called the; "*Coordination Reform*" [32], and was published by the Ministry of Health and Care Services. Thereafter, an empirical study was performed at UNN, in order to explore the readiness for electronic communication between patients and the hospital during pre-operative planning. Both the health care workers involved in pre-operative planning at UNN, and the hospital, as an entity, in pre-operative planning, were addressed.

This paper is divided in five sections. In the Section 1, the problem with surgical cancellations is introduced, and the aim of the study is described. In Section 2, the background of the study is presented. It gives a brief introduction to the existing knowledge on e-readiness, and on challenges with ICT in health care. The data collection methodology is presented and explained in Section 3. The results are disclosed and interpreted in Section 4. In the last section, discussion and conclusions, the authors elaborate on the readiness to use electronic communication in health care.

II. BACKGROUND

It is reported that patients from within the Norwegian population are well prepared and able to use ICT [9],[15],[33],[34]. In addition, health care workers use personal electronic devices to support their clinical work [13],[14],[24]. Despite this, there is substantial evidence in the field of health ICT, on unsuccessful implementation projects [16]-[18]. Challenges with implementation, slow diffusion and unforeseen consequences of ICT in health care, particularly in hospitals, have been reported [16]-[28].

Patients already use electronic health care services, and health care workers are extensively using their own devices in their daily work. However, slow diffusion and failed implementation are reported. If patients and health care workers are ready, why are the ICT implementations in hospitals often failing?

The eTeam-Surgery project is approaching this paradox. In order to go beyond individuals' readiness, and explore the possibility of using electronic communication between the hospital and the patient, the need for a new approach was identified. In this paper, the authors are considering the recent Norwegian health reform and the hospital as entities, while focusing in e-readiness in the context of the pre-operative planning process at UNN.

III. MATERIALS AND METHODS

In order to approach the readiness for electronic communication in the Norwegian health care sector, multiple and diverse methods were needed. Therefore, the method section is divided in two parts. The first part has a more general motivation, and consists of a documentary study of the Coordination Reform, focusing on e-readiness. In the second part, in order to approach the e-readiness at UNN, an in-depth, empirical study of the pre-operative planning process was carried out.

In the study of the Coordination Reform, the focus was on the readiness to use electronic communication within the Norwegian health care sector.

The empirical study consists of three phases. In order to keep this paper self-contained, the empirical methodology will be described briefly hereafter; for further information refer to [35].

- *Stage 1* Gather data on the hospital's representation of the elective surgery cancellation problem;
- *Stage 2* Observations and interviews at the hospital, related to the pre-operative planning processes at department level;
- *Stage 3* Individual, in-depth interviews with all professional groups involved in pre-operative planning at a specific hospital department.

In Stage 1, the aim was to gather knowledge on UNN's understanding of the elective surgical cancellation problem, and the hospital representation of the pre-operative planning process. One document, containing information on the use of resources involved in surgery at the hospital was identified and studied [15]. In 2012, UNN initiated a Lean project in order to optimize the elective surgical process. Researchers from the eTeam-Surgery group followed this project.

In Stage 2, the pre-operative planning process at different departments at UNN was investigated. This comprised three weeks of fieldwork at the Surgery and Intensive care clinic, doing interviews while following an anesthesiologist and an anesthetic nurse. In addition, thirteen interviews with physicians, nurses and administrative personnel were conducted, at six different departments. The interviews were semi-structured, done at the workplace, and lasted between thirty minutes to two hours.

During the first two stages, two departments were described to be more efficient. However, these departments still evidenced a representative number of cancellations. One of the departments was chosen to proceed with an in-depth study in Stage 3. The chosen department is not revealed due to ethical reasons. In Stage 3, representatives from all the professional groups involved in the pre-operative planning process at UNN were addressed. At this specific department, extensive knowledge on the pre-operative planning process was collected. The department-specific interviews were semi-structured, done at the workplace, and lasted between one to two hours.

IV. RESULTS

The results section is reported considering the analytic categories of the findings. These categories were defined in

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order to discuss the e-readiness within the health care sector in Norway. The categories are:

a) *Norwegian health policy*: Readiness within Norwegian health policy, where the findings from the documentary study are reported;
b) *Health care workers at the hospitals*: reports from the interviews carried out during stages two and three of the empirical study;
c) *The hospital as an entity*: reports from all three stages of the empirical inquiry.

A. Norwegian health policy

In the preface of the Coordination Reform, the Minister of Health and Care Services stated that: "*Norway ranks among the highest of all OECD nations – but we have not achieved a corresponding high level of health in return*" [10]. The Minister wanted to change this: "*With smart solutions, patients will receive proper treatment at the right place and at the right time. We will achieve this through the Coordination Reform*" [10]. A clear goal on the use of ICT in the Reform, as stated on page 135, is that "*electronic communication should be the standard way of communicating*" [10]. In line with this vision, an extensive ICT investment is currently taking place in the northern health region of Norway, including at UNN. The Northern Norway Regional Health Authority is investing € 62.5 million in the FIKS project (from the Norwegian "*Felles innføring kliniske systemer*") to develop the electronic health record for the future – a fundamental tool for high-quality patient treatment [33]. This is the largest ICT project in the northern health region ever.

The quotations from the Norwegian health policy, as well as the regional health authorities' heavy investment in new electronic tools, demonstrate readiness for health IT, both on national and regional policy level.

B. Health care workers at UNN

During our observations and interviews at the hospital, we did not experience any resistance from the health care workers towards electronic communication. On the contrary, most health care workers expressed frustration over the cancellation situation at the hospital, and stressed the need for new communication tools.

A surgical nurse related the need for new ways of communication to the current "quick in-quick out" trend in elective surgical procedures. The nurse emphasized that this trend requires new ways of communicating with patients prior to hospital admission, in order to prepare them for surgery while they are still at home. The nurse explained, that before, when patients arrived earlier at the hospital, nurses were responsible for nursing and preparing them for surgery. Such preparation included, e.g., cleaning, shaving, and nail trimming according to the hygienic standard required for surgery. Today, many patients are responsible for doing these tasks themselves. They must follow the hygiene instructions, given by the hospital, at home. The nurse's main concern was related to infections. In this context, an electronic communication tool between the patient and the hospital was suggested to help patients prepare for surgery.

From our analysis of the interviews with health personnel, it is our interpretation that nurses, physicians and administrative personnel are ready for new tools for patient-hospital communication. As an example, different health personnel at the hospital have suggested SMS reminders and e-mail conversations during surgery scheduling.

C. UNN as an entity

During the inquiry of UNN's representation of the elective surgery cancellation problem, one internal report was identified and studied [15]. The report acknowledges challenges with the continuity of patient care at the hospital, and links it to poor interaction between the different professional groups involved in surgical practice [15]. This study also revealed that in order to optimize the elective surgical process at UNN, a Lean project had been initiated at the hospital in 2012. The aim of both initiatives was to promote continuity of patient care, improve the use of resources in surgery, and reduce elective surgery cancellations. Electronic collaboration as a mean to improve the continuity of care during the pre-operative planning process was not suggested in these initiatives.

The main finding from the empirical fieldwork done in stage two, was internal variation between the different departments in who plans the surgery and how, and when the planning was done. The departments have developed their own local practices. At some departments, senior surgeons do the pre-operative planning. In other departments, this planning is done as teamwork, involving senior and junior physicians, nurses, and secretaries.

Based on the empirical findings, a homogeneous structure for the pre-operative planning process at UNN could not be identified. In addition to diversity at the department level, the fieldwork revealed heterogeneity in how professionals described the pre-operative planning within the same department. It was not possible to describe a standard pre-operative planning structure at the selected department. It is the authors' understanding that in order to complete the daily schedule, health care workers use personal and empirical knowledge. The main finding from the empirical inquiry at UNN was heterogeneity in how departments and individual professionals carry out the pre-operative planning process.

V. Discussion and Conclusions

Is the Norwegian health care sector ready for electronic communication during pre-operative planning?

Literature argues the patient's readiness towards electronic communication. The eTeam-Surgery project has not yet approached empirically the patient readiness; therefore, no conclusions will be drawn on this subject. However, the Norwegian Government states a strong wish for electronic communication in the Coordination Reform. This interpretation is in line with Tjora and Melby's [36] analysis of the reform.

The empirical study at UNN reveals that health care workers involved in the pre-operative planning are ready for electronic communication. This was clearly illustrated in the suggestion made for an electronic communication tool to help patients prepare for surgery at home.

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Since the Government, the patient and the health care workers are willing and ready for electronic communication, the next step was to address readiness within the hospital as an entity. The main finding from the empirical study of the pre-operative planning process at UNN was heterogeneity in how departments and individual professionals described and carried out this planning process. It is our understanding that in order to complete the daily schedule, the hospital is dependent on the health care workers' personal and empirical knowledge, and enthusiasm. Since the pre-operative planning process at UNN is heterogeneous and dependent on the workers' proactivity, it is our interpretation that the hospital, as an entity, at this stage, is not ready for electronic communication between patients and the hospital. This conclusion is based on the recognition that in order to develop and implement sustainable electronic communication systems, computer scientists need to identify standard patterns of information and workflow. Such patterns are hard to identify in an organization where the pre-operative planning process can be described as arbitrary and dependent on the individual health care worker preferences.

Our conclusion is that while Norwegian health policy strongly promotes electronic collaboration, and health care workers are ready to use new tools, the hospital, as an entity, at this stage, is not yet ready for electronic communication between patients and the hospital in pre-operative planning. It is our understanding that, in order to successfully implement electronic communication in pre-operative planning, the hospital, as an entity, needs to be analyzed, accounted for and prepared for health IT.

The conclusion is interesting on multiple levels. For the eTeam-Surgey project, it has great impact on future work, as it raises an important issue on the e-readiness of the organization. In an applied context, it has relevance for policy makers, managers in the health care sector, and for stakeholder in the field of health ICT, e.g., vendors and large ICT implementation projects. For the scientific field and the debate on e-readiness, it means that the concept of user involvement and the definition of who the users are need to be revisited. As demonstrated in this paper, the health policy and the hospital, as entities, are important non-human actors, which need to be studied, analyzed and accounted for in relation to the question of readiness for electronic communication in the health care sector.

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