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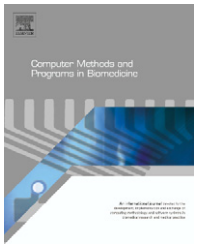

Usefulness of a Regional Health Care Information System in primary care
A case study

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ABSTRACT

The goal of this paper is to describe some benefits and possible cost consequences of computer based access to specialised health care information. A before–after activity analysis regarding 20 diabetic patients' clinical appointments was performed in a Health Centre in Satakunta region in Finland. Cost data, an interview, time-and-motion studies, and flow charts based on modelling were applied. Access to up-to-date diagnostic information reduced redundant clinical re-appointments, repeated tests, and mail orders for missing data. Timely access to diagnostic information brought about several benefits regarding workflow, patient care, and disease management. These benefits resulted in theoretical net cost savings. The study results indicated that Regional Information Systems may be useful tools to support performance and improve efficiency. However, further studies are required in order to verify how the monetary savings would impact the performance of Health Care Units.

1. Introduction

Today, the adoption of Regional Health Care Networks is a top priority in the field of medical and health care informatics [1–3]. There are a great number of diverse Information Systems in use, the goal of which is improved efficiency of health care services. There is an urge for standards and interoperability of systems in countries which have in the recent decades gradually adopted Information Systems [4,5]. Regional Networks strive towards the shared use of Regional Information Systems by networking entire regional administrative areas, such as Health Care Districts. The goal is to support seamless care and patient care chains throughout primary, secondary and tertiary care, and within the home care section by providing timely, high quality care, based on the most recent diagnostic data. Health Centres offer primary care services. Secondary and tertiary care is provided by Central Hospitals and University Hospitals, respectively. There is a need for integrated Information Systems, and for a comprehensive information infrastructure at intra-hospital, regional and national level. In fact, the Finnish Ministry of Social and Health Affairs promotes efforts towards building Regional Information Networks based on a reference registry [6].

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The recurrent lack of diagnostic information is generally recognised [7]. On the other hand, the quality of care has been connected with the level of communication between primary and secondary care units [8]. Information Systems may offer efficient alternatives to support trans-institutional co-operation, to reduce the use of written documents, paper processing and telephone calls [9], and to reduce operating costs [10]. There are studies which suggest that timely availability of diagnostic information not only improves patient care, but also brings about cost savings [11]. Furthermore, the effectiveness of the use of Information Systems compared with traditional activity has been established, i.e. that costs were lower and medical benefits were greater [12]. The adoption of Health Information Systems including Electronic Health Records has progressed slowly; consequently the expected benefits have not been fully realised [13]. Some 15 years ago, it was foreseen that the transition to fully electronic activity might take up to three decades in some medical specialities [14]. Currently, this seems to be applicable to many Information System efforts.

It has been established that Health Information Systems may improve the performance of medical personnel, as well as diagnostic quality, disease management, and patient outcome, although the relationship between these systems and the benefits remain understudied, and methods and results are inconsistent [15]. The diversity of clinical settings, the variety of study methods, and the general immaturity of the research field challenge the comparison of results [16,17]. The relative newness of the field, the absence of a sufficient, adequate and compact research community, and lack of funding have all prevented the achievement of solid results. However, there is general consensus that widespread use and networking of Health Information Systems could eventually induce cost savings, especially in the area of preventive medicine and chronic disease [18]. In fact, it has been demonstrated that the use of Information Systems supports clinical performance and preventive care [19], and there are indications that the improved performance may enhance the revenue of a health care unit [20].

Diabetes may be regarded as an information intensive disease. Therefore it may be regarded an excellent study target to explore the usefulness of Information Systems. As a chronic, advancing disease its outcome depends on preventive medicine, follow-up programmes, and timely procedures embracing specialities such as amputation surgery, cardiology, clinical physiology, endocrinology, eye imaging, foot care, internal medicine, nephrology, nutritional therapy, ophthalmology, radiology, specialised nurse services, or venal surgery. Furthermore, diabetes is increasing rapidly; its total cost exceeded one billion euros already at the beginning of the 21st century [21]. It has been established that the quality of care connected with proper management of the diabetic care continuum may provide a means to control the outcome and cost of the disease [22]. There were 7585 medicated diabetic patients in the Satakunta Hospital District [23]. Primary care was provided by Health Centres, and secondary care was available in Satakunta Central Hospital.

Satakunta Central Hospital has adopted a Regional Health Care Information System service, the aim of which was to enable all Health Centres of the region to have access to secondary care diagnostic information regarding all patients. The study included a typical Health Centre serving approximately 20 000 inhabitants, which represented nearly 10% of the total population of the region. The Health Centre has organised a follow-up programme for the treatment of its 461 diabetic residents [23]. A more comprehensive study including four Health Centres was performed [24].

The goal of this paper is to highlight the possible usefulness of the Regional Health Care Information System. The concept of usefulness is applied, in the sense of the possible costs and benefits of having real time access to the most recent diagnostic data. The following particular questions are addressed:

- Does access to real time diagnostic information change workflow?
- Does access to real time diagnostic information change patient care?
- Does access to real time diagnostic information change disease management?
- Does the use of the Regional Health Care Information System induce net savings?

2. Methods and materials

In 2005 a before–after activity analysis regarding the clinical appointments of twenty diabetic patients was conducted. The study setting consisted of two Health Care Units, namely Satakunta Central Hospital, and a Health Centre located in the Satakunta region. The Regional Health Care Information System (FujitsuInvia Ltd./Finnish Post Ltd., Itella) enabled access through a reference register to any entered patient data [6], and each local Information System automatically created a reference to the register [25,26].

In the preparatory phase of the study a semi-structured thematic interview was conducted. The physician in charge of diabetes care was interviewed for background information for 90 min. The interview was tape recorded and transcribed. The goal of the interview was to ensure that the study would be focused on relevant issues, and that the staff would be involved in the study. In addition, its aim was to provide the non-medic researchers' with a comprehensive understanding of the health care delivery system of this particular region, and of the work procedures of these particular health care units. The themes of the interview included medical aspects of providing primary care for diabetic patients at general level, cross-organisational co-operation with secondary care, patient care and diagnostic information needs. In addition, the following themes came under scrutiny: the patient flow between primary and secondary care; procedures triggered by unavailable diagnostic information; and the impact on patient care, organisation and personnel working conditions.

Time and motion studies were applied to study the clinical appointments. A stopwatch was used in order to determine the crucial work processes, and their duration. The time-and-motion studies were performed by an independent researcher, starting when the patient was called in, and ending when the patient left the examination room. The researcher could later ask questions about both the logic and the reasons behind